

ROADS

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ANN ARBOR, MICH.
COMP-LRY-11-50

HIGHWAYS BRIDGES
AIRFIELDS
HEAVY CONSTRUCTION

STREETS

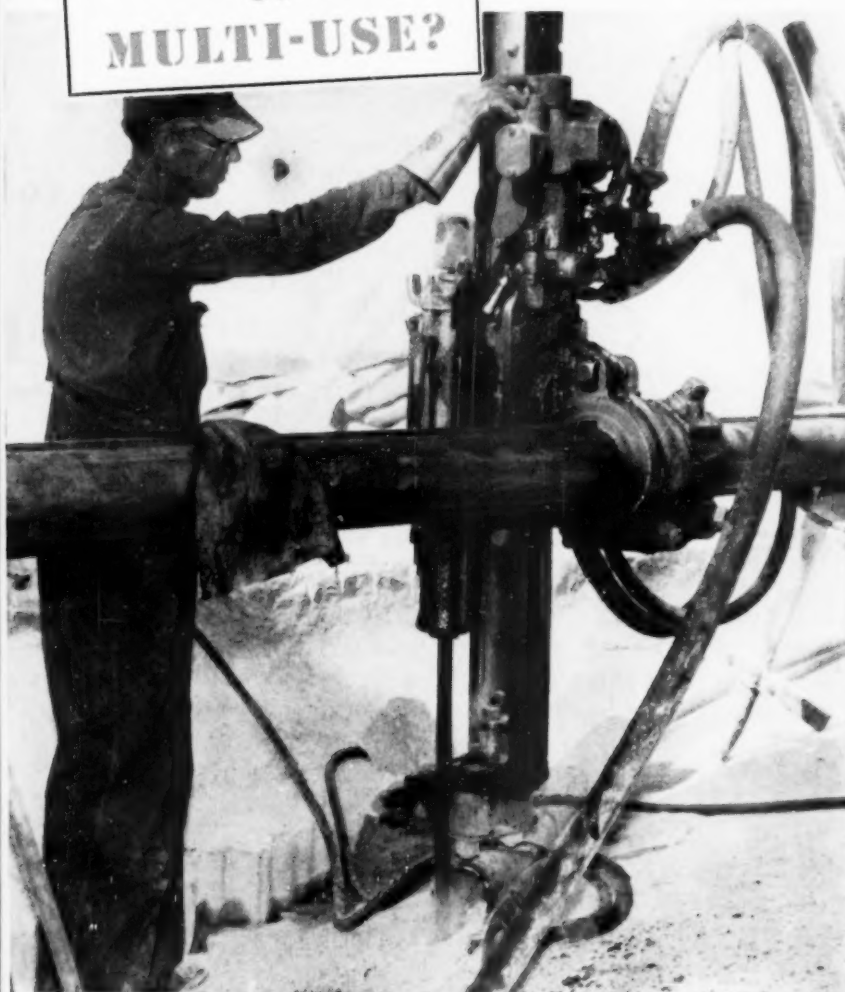
AUGUST 1953

Gillette Publishing Co., 22 W. Maple St., Chicago, Ill.
Form 3547 Requested

Acceptance Authorized Under Sec. 34.64 P. L. & R.

**CARBIDE
INSERT?
or
MULTI-USE?**

**Dixie Granite Co. gets 200 more feet of hole
per bit with TIMKEN® carbide insert bits!**



DIXIE Granite Company has standardized on Timken® carbide insert bits in channel drilling of granite for these four reasons: Timken carbide insert bits average 200 feet more hole per bit than other makes of forged bits! 50% increase in drilling speed! 25% lower cost per foot of hole! 25% production increase with fewer drills.

Through hard gaud abrasive round, Timken carbide insert bits are the most economical. And they're your best bet for constant-gage holes, small diameter blast holes and very deep holes.

But for ordinary ground, use Timken multi-use bits. With correct and controlled reconditioning, they'll give you the lowest cost per foot of hole when full increments of steel can be drilled.

The combination of Timken carbide insert and multi-use bits will solve all your requirements. Because both are interchangeable in each thread series, you can switch bits as the ground changes—right on the job. As many as 93 different Timken bits fit the same threaded drill steel. And both Timken carbide insert and multi-use bits are made from electric furnace Timken fine alloy steel, have the shoulder union that protects threads from drilling impact, are quickly and easily changed.

To get the best bits for your job, call on the Timken Rock Bit Engineering Service. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

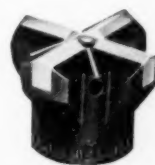
LOCATION: Quarry near Carlton, Georgia OPERATING CONDITIONS: Channel drilling of granite

**your best bet for the
best bit for every job**

TIMKEN



Timken threaded
multi-use rock bit



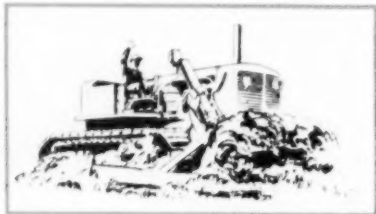
Timken threaded
carbide insert rock bit

Advance design features make Allis-Chalmers Tractors performance leaders

It takes truly modern equipment to keep pace with today's stepped-up demands — and do it at an operating cost which insures fair and consistent profits. The line of Allis-Chalmers crawler tractors has been designed and built completely new since the war, with the kind of advanced engineering that delivers big-capacity performance at a minimum of maintenance expense.



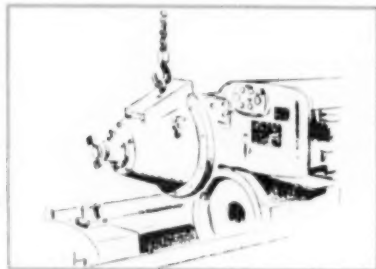
Daily Lubrication



1000-hour Lubrication. Operate six months on a 40-hour week basis with just one lubrication of truck wheels, front idlers and support rollers. Positive seals protect from dust, loose sand, soft ground, mud or water. You gain working time, save labor and lubricant costs, eliminate costly damage from greasing neglect.



Major Tear-Down



Unit Servicing. No need to remove transmission or engine, radiator, grille, etc., when servicing or removing an Allis-Chalmers master clutch. The unit assembly principle also applies to final drive gear, transmission, steering clutches, engine and truck frame. Save hours of costly service and down time.

Single Reduction Final Drive



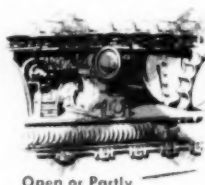
Double Reduction Final Drive. With smaller gears and shorter shafts, double reduction final drives provide better bearing and gear alignment. The "live" axle permits smaller, more serviceable seals. Equally important, double reduction drive provides for smooth, clean bottom construction and the extra ground clearance so necessary on rough terrain.



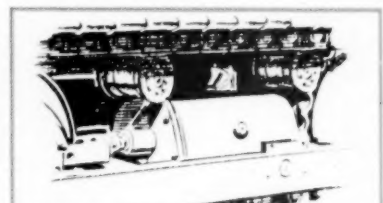
Ordinary Steering Clutches



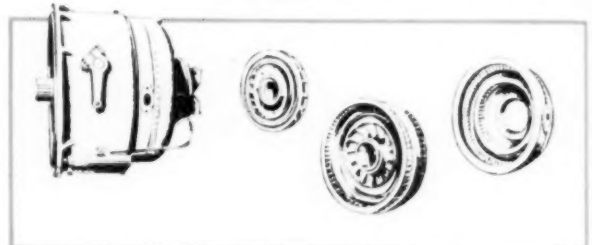
Hydraulic Steering and Self-Energizing Brakes. The HD-15 and HD-20 have hydraulic booster steering; operator exerts only 3 to 5 lb. pressure on controls, so he gets small tractor maneuverability from these 27,850 and 41,000 crawlers. Self-energizing brakes need less pedal pressure, take hold with a firm, uniform grip.



Open or Partly Shielded Track Release Mechanism



Oil Enclosed Track Release Mechanism. Operating in oil and sealed against dirt and moisture, Allis-Chalmers track release mechanism seals out mud, ice and debris. Because it's completely sealed, release mechanism is in working condition at all times — providing positive protection when obstacles jam into the tracks.



Hydraulic Torque Converter Drive. The HD-20 is the only crawler tractor where torque converter is standard equipment and part of the basic design. Torque converter gives greater payload capacity because this unit automatically balances travel speed to the load. And with most shifting eliminated, there's far less operator fatigue.

ALLIS-CHALMERS

TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

ORIGINATOR OF THE
TORQUE CONVERTER TRACTOR

New Idlewild Taxiway Carries Lots of Weight

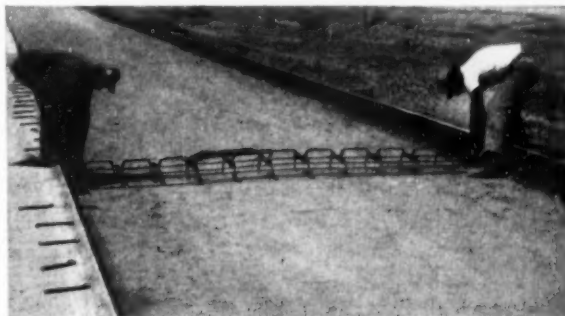


New taxiway at Idlewild is designed to carry heavy planes like this BOAC Stratocruiser. The taxiway is 6000 ft long and 100 ft wide.

Giant superliners, bound for points overseas, are now using new taxiway T27 at New York International Airport, at Idlewild. This mile-long strip, containing more than 23,000 cu yds of concrete, is 13 in. thick and supports a 300,000-lb plane equipped with two sets of dual wheels.

Located at the south end of Idlewild, taxiway T27 was designed to carry heavy Constellations, Stratocruisers and other big planes between international runways and the loading stations. Bethlehem Dowel Units, of the same type that were selected for the original runways and taxiways at Idlewild, were used in the construction of this new taxiway.

Minimizing load-transfer problems caused by heavy wheel loads, Bethlehem Dowel Units transfer the weight of the plane from one side of the joint to the other, while offering minimum restraint to the movement of the slab due to expansion or contraction. The units hold the dowels in accurate alignment at all times, permitting free dowel movement in the concrete.



Bethlehem Dowel Units minimize load-transfer and expansion-contraction problems.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



BETHLEHEM REINFORCING STEELS

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ROADS AND STREETS

AUGUST, 1953 • VOL. 96 • No. 8

Roads and Streets represents 61 years of continuous publishing in the highway field; combined with Engineering & Contracting and Good Roads Magazines, established in 1892

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A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

Coming Articles

How a Big Contractor Keeps up 3500 Machines

A glimpse at the shop facilities and organization of equipment overhauling of a fleet that \$20 million couldn't buy.

What Our Northern Cities Will Do About Snow and Ice

Minneapolis, Toronto, Boston, and several other cities to be reported in Autumn issues of Roads and Streets, beginning next month.

Railway Decks Rolled into Place between Trains

Fostoria, Ohio, eliminates three crossing gate blockades, in state program to streamline arterial and local traffic through town.

Bituminous Design Studies Compare Test Results

Researchers with Purdue University apply Corps of Engineers test procedures to Indiana bituminous mixes, with interesting conclusions.

Also . . .

Several noteworthy bridge projects to be described . . . The New York Thruway and other toll roads to be covered in a series of on-the-scene reports . . . Truck laneing to cut accidents, step up traffic capacity . . . How shift-time traffic jam is averted at Paducah atomic energy project . . . Autumn meetings to be reported.

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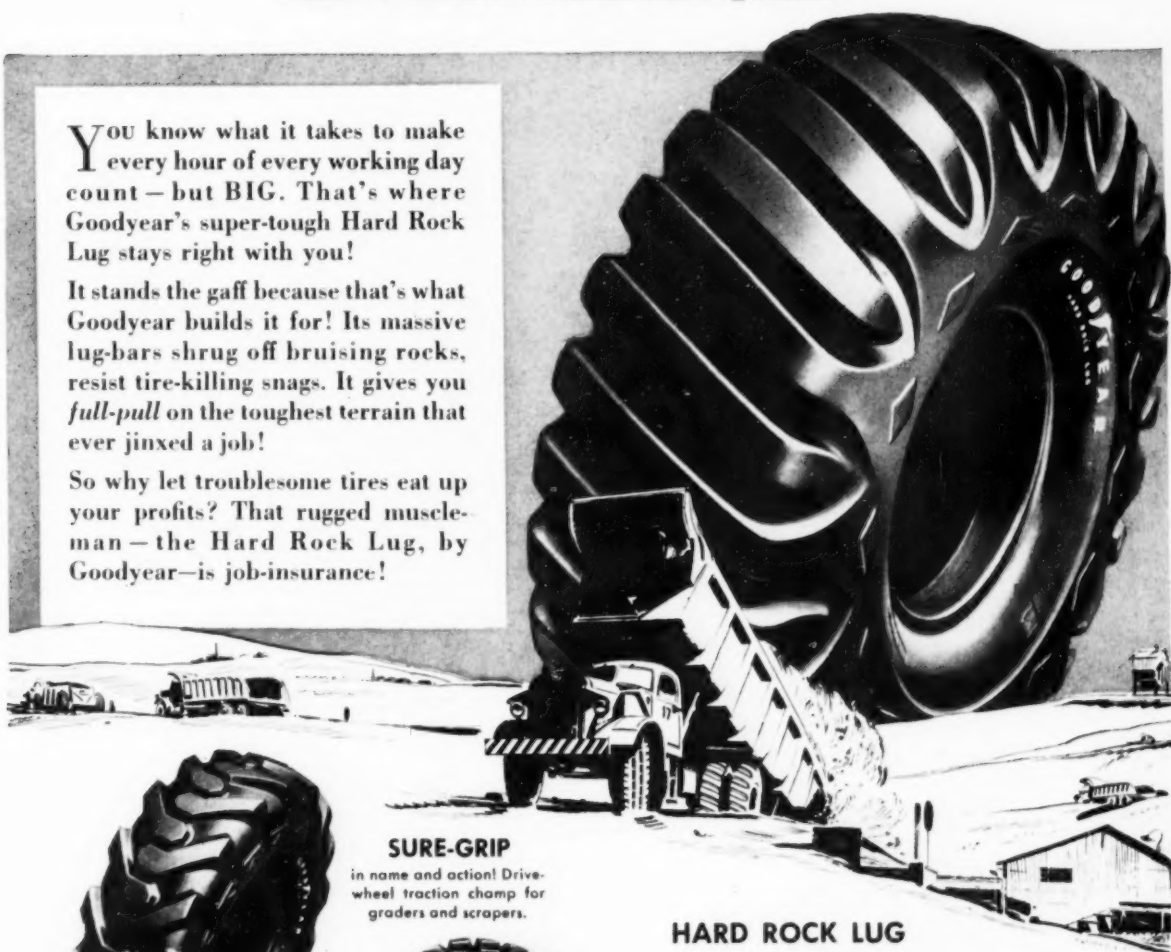
MONEY SAVER

on rock-ridden jobs

You know what it takes to make every hour of every working day count — but BIG. That's where Goodyear's super-tough Hard Rock Lug stays right with you!

It stands the gaff because that's what Goodyear builds it for! Its massive lug-bars shrug off bruising rocks, resist tire-killing snags. It gives you *full-pull* on the toughest terrain that ever jinxed a job!

So why let troublesome tires eat up your profits? That rugged muscleman — the Hard Rock Lug, by Goodyear — is job-insurance!



SURE-GRIP

in name and action! Drive-wheel traction champ for graders and scrapers.



ALL-WEATHER

— finest for flotation, rolling big loads faster.



HARD ROCK LUG

— super-tough champ for all kinds of rock work.

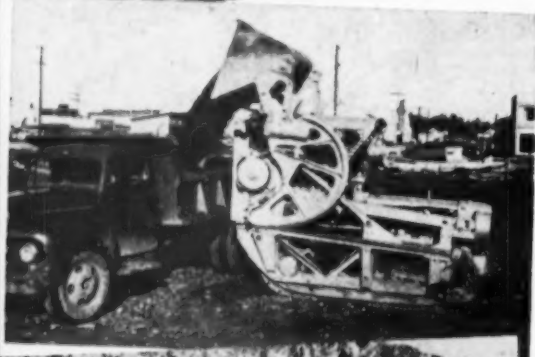
*FOR EACH JOB,
THERE'S A COST-CUTTING
GOODYEAR TIRE!*

All-Weather, Sure-Grip—T.M.'s
The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

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ROUGH—TOUGH JOBS—SPECIFY EIMCOS

When jobs are tough — it's more imperative than ever that an Eimco be selected to do the job.

Eimcos are built heavy, for dependable operation on the roughest, toughest jobs; for handling rock, sticky clay, gravel or any combination of hard to load materials.

With Eimcos you get a faster loading cycle — forward to dig and load back to discharge into the truck or railroad car. This action makes it easier on tracks and rollers for less maintenance and repair.

Quantities loaded can run from 300 to 350 yards per hour depending on your conditions.

Let an Eimco representative show you a machine working near you. Write for more information.

You can't beat an Eimco

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THE EIMCO CORPORATION

The World's Largest Manufacturers of Underground Rock Loading Machines.
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You pick the job!



WHAT'S the toughest blading operation you've got? Ditching? Bank-sloping? If you want to see it done better, easier, with more work output per hour, watch a Cat* Motor Grader handle it.

Watch the operator change through the full range of blade positions in one minute without leaving his seat! Get into the seat yourself! Notice how the operator has a full view of his work without standing up. Check the steady production with no stops for adjustment.

Your Caterpillar Dealer is ready to demonstrate

any of the three models—No. 212, No. 112, or No. 12. Fair enough? Call him today.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

5" RAIN

**2 "C's" move 200 saturated yds. hourly
over 2000' of muddy grades**

Johnson Construction Co., Litchfield, Minnesota, really found out how Tournapull all-weather mobility pays off when they widened and regraded Minn. State Highway 5 between Victoria and Chanhassen. Frequent rains hampered their 386,000-yard job from the start. The third month of work, for example, it rained 16 days out of 31. Then, near the end of the job when every hour counted because of interruptions already caused by weather, another 5" fell in 48 hours. Borrow pits were again thoroughly soaked . . . haul roads made slick and muddy . . . fill areas very soft and spongy.

Average 10 pay yds. per load

Mud or no mud, Johnson sent their 2 rubber-tired C Tournapulls out as soon as the weather cleared. Loading the completely saturated clay, loam and sand, and hauling over slippery, hilly roads, each "C" completed a 2000' cycle every 5 minutes. The 2 rigs made 20 trips . . . moved 200 pay yards per 50-minute hour.

LeTourneau users since 1938

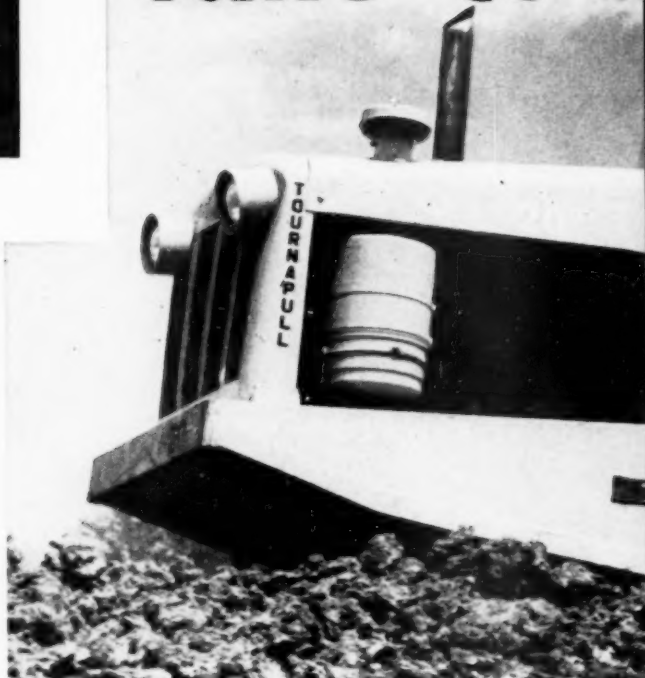
This kind of performance is one reason Johnson has used LeTourneau rigs for the last 15 years . . . has placed repeat orders for 15 scraper units. These veteran contractors *know* that Tournapulls' go-anywhere mobility means fewer hours lost for weather or job-to-job travel . . . longer work seasons . . . lowest-net-cost-per-yard under *any* conditions. For proof that Tournapulls will pay off for *you*, ask your LeTourneau-Westinghouse Distributor to show you owner-verified production records or to arrange a demonstration on your job.

**LeTourneau - Westinghouse
Company**



PEORIA, ILLINOIS

fails to



At the fill, Tournapull spreads load of wet sandy clay in 10 to 20 seconds, over a distance of about 60 feet. As on all their jobs, rigs saved time and expense by driving to site under their own power.

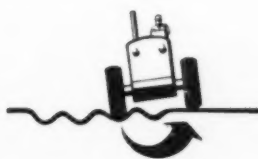


tie up C Tournapulls



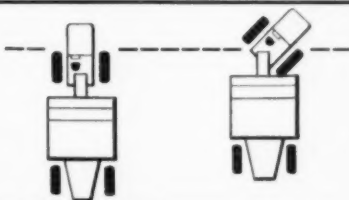
Working in wet mud and clay that at times reached their hubs, Tournapulls were push-loaded with 10 pay yards in 60 seconds . . . distance, 80 ft. On the muddy 1000' up grade haul, rigs averaged 9 mph.

Why Tournapulls *KEEP GOING* in soft footing



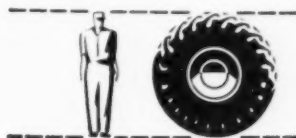
1

Torque-proportioning differential automatically transfers power from slipping drive wheel to wheel on firmer footing . . . puts up to 4 times more "pull" on gripping tire. There's power on both drive wheels at all times.



2

Positive power steer pivots prime-mover left or right, independent of traction on drive wheels . . . enables operator to "walk" Tournapull out of soft spots to firm ground.



3

Big, low-pressure tires, 21.00 x 25, easily roll through mud holes or over ruts . . . provide the high flotation and traction you need for working in mud, sand, snow, or other soft materials.

Tournapull—Trademark Reg. U. S. Pat. Off. P-3-H

TOURNAPULLS . . . for lowest-net-cost-per-yard



Balanced Design...

ONE REASON WHY **BUCYRUS-ERIE** BLADES CUT ROADBUILDING COSTS

WHAT BALANCED DESIGN IS ... Bucyrus-Erie bulldozers and Bullgraders are mounted on International TD-14A and TD-18A tractors so that the vital balance point of the tractor remains virtually unchanged.

WHAT IT DOES ... It means that the tractor retains all of its original tractive effort and maneuverability. It puts maximum driving force where it belongs—at the blade. Because there is always a full length of track on the ground, you take full advantage of tractor power and get fine, accurate control over the blade. Finally, there is less wear and tear on the tractor.

HOW IT CUTS ROADBUILDING COSTS ... Better blade control and tractor maneuverability enables operator to produce accurate grading and fine finishing in a minimum of passes—you *save time*. Having the advantage of full tractor power lets you move more dirt on every pass and get the job done faster—you *save money*. Since there is no waste of tractor power, you *save fuel costs*. And lastly, because there's no upset of balance to strain the tractor there's less wear on tractor parts—you *save maintenance costs*.

Investigate these and the many other features offered in Bucyrus-Erie blade attachments. Get the complete story from your International Industrial Tractor Distributor today.

7153

BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin



TD-14A and TD-18A Bullgraders and Bulldozers Hydraulic or Cable Controlled

SEE YOUR INTERNATIONAL INDUSTRIAL TRACTOR DISTRIBUTOR



Natural Rubber Roads . . . Newest Highway Advance

Laboratory tests to date indicate that natural rubber powder added to ordinary asphalt paving mix will build roads that last longer, require less repair, and are less costly in the long run. When proven, this means savings of millions of dollars for the taxpayer. Natural rubber-asphalt test roads have already been laid in nineteen states in the U. S. and in several provinces of Canada.

Test Rubber Roads for Yourself

This year scores of towns and cities all over the nation are testing this promising new development. By paving a block with natural rubber-asphalt, any town or city can make its own test inexpensively under its particular climate and traffic conditions to find out how much money rubber roads could save them in years to come.

A natural rubber test section is easy to lay. It requires only the addition of a small amount of natural rubber powder to the mix, with no change in conventional paving methods or equipment. The rubber powder costs less than



Natural Rubber Bureau 1631 K Street, N. W., Washington 6, D. C.

Natural Rubber Bureau Research Laboratory,
Rosslyn, Virginia

\$500 for the average block. For complete information that will tell you how to Pave-A-Block and test rubber roads in your community, just mail the coupon.

Natural Rubber Bureau

1631 K Street, N. W., Washington 6, D. C.

Please send me, without obligation, information on how to PAVE-A-BLOCK with natural rubber-asphalt road surfacing.

NAME _____

TITLE _____

STREET _____

CITY _____ STATE _____

2 Days = 1 Bridge

1 Cleaning out creek bottom with 'dozer.



2 Assembled MULTI-PLATE structure.



3 Lowering structure into creek with cables.



4 MULTI-PLATE Pipe-Arch ready for backfilling.



Small crew assembles Armco MULTI-PLATE Pipe-Arch without heavy equipment.

No, they weren't trying for a record. To the construction crew, this bridge replacement job was just another MULTI-PLATE installation. Yet it was 50 feet long, with a 16½ foot span.

Here's how the job went. First, the creek bottom was cleaned up. Then the small crew assembled the Armco MULTI-PLATE Pipe-Arch on the road. Next, the structure was lowered into position with wire cables. Backfilling followed and rip-rap placed at the beveled ends. Job done.

To you, this means that Armco MULTI-PLATE Structures are quickly and easily installed — with lower labor costs. Lightweight MULTI-PLATE sections simplify handling, and no heavy equipment is needed for assembly. Regular structural wrenches take care of most of the work.

Armco MULTI-PLATE Drainage Structures are available in a wide size range. They are used for small bridges, large culverts, underpasses, or for relining failing structures. Write for details. Armco Drainage & Metal Products, Inc., 4193 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

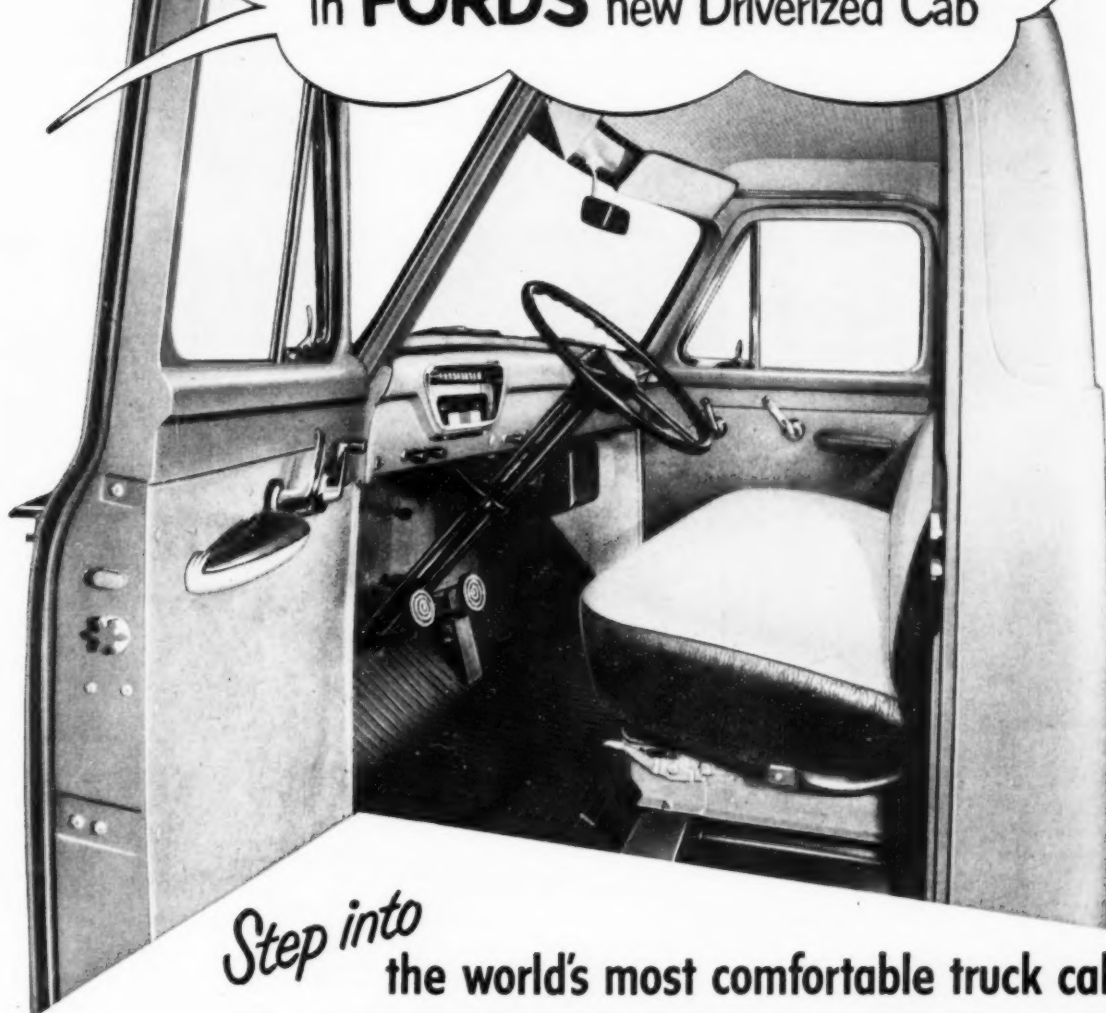
ARMCO
MULTI-PLATE STRUCTURES



5 Backfilling and rip-rap almost complete.



Before you buy any truck... Make the
15-second SIT DOWN TEST
in **FORD'S** new Driverized Cab



Step into the world's most comfortable truck cab!
It's new! It's DRIVERIZED! Only FORD has it!

It's a truck driver's dream come true! You'll know it too, in just the 15 seconds it takes you to . . . *swing open the new wider doors... slide into the 3-man comfort seat with exclusive shock-snobber . . . sweep your eyes across the one-piece windshield and back to the 4 ft. wide rear window . . . stretch out in big cab roominess... sigh a sigh of solid comfort. Man! What a treat for a working guy!*

The completely new Ford Trucks offer many great advancements in easier driving and time-saving delivery, all at the same low price.

They offer new power for sustained speed travel—new Synchro-Silent transmissions for faster, easier shifting—new set-back front axles for sharper turning—new features throughout to help *get jobs done fast.*

Choose the one right truck for your work from over 190 completely new Ford Truck models.

And before you buy any truck, make the *15-second Sit Down Test*. It will open your eyes to comfort you never thought possible in a truck. See your Ford Dealer today!

FORD ECONOMY TRUCKS
SAVE TIME! SAVE MONEY! LAST LONGER!



THERE ISN'T ANY DUST ON A DOWFLAKE-TREATED ROAD!

DOWFLAKE keeps gravel roads from blowing away, makes them safer and protects surrounding area



Economy . . . safety . . . goodwill . . . all result from treating unpaved roads with Dowflake® (Dow calcium chloride 77-80%). And all are extremely important to road officials and the community.

Dowflake draws moisture out of the air, keeping the road damp, the dust down. Roads can't "blow away" due to heavy traffic and hard winds. This cuts down repeated gravel replacement, saves high material and labor costs.

Less dust means safer roads and better visibility. On Dowflake-treated roads motorists can see where they are going and traffic can safely move at a steady pace.

Housewives and farmers that live near unpaved roads

appreciate the benefits of Dowflake, too. It keeps the house free of dust; laundry can be hung out without fear of its getting dirty. The farmer's crops grow better and bring more on the market when they aren't laden with dust and dirt.

Write today and get the complete story on how Dowflake will make your roads more economical to maintain, safer to drive on and a credit to your department and your community. Inquire about Peladow®, Dow's new highest, pellet-form calcium chloride (94-97%) also engineered for highway use. In addition to 100 lb. bags, Peladow can be shipped in bulk in closed hopper cars. THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on **DOW CHEMICALS**



Gradall Makes News in Houston

Here is a full page feature story from the Houston, Texas Sunday Chronicle. In it Staff Writer Dick Tate reports his interview with Mr. H. C. Hord, Superintendent of Houston's City Street Repair Division. Mr. Hord's enthusiastic approval of the Gradall, plus the fact that the city owns six of these multi-purpose machines, shows that the Gradall is cutting costs and winning supporters in Houston!



Ready to take a bite, this new "almost human" ditch digging machine is one of several acquired by Houston recently. Operators like C. M. Roberts can control the bucket's bite within an inch.

Photos by Alan Beason

Ditch Diggin' Demon

BY DICK TATE
Staff Writer

"JUST STRAP a razor on the bucket and I'll shave you with it."

That's what Superintendent H. C. Hord, city street repair division, thinks of the new street repair equipment recently acquired.

Actually the machines (the city bought six) are used for ditch cleaning and digging as well as other street repair chores. But they are so delicately controlled that they are almost human in some respects.

Mounted on trucks, they are a sort of junior-sized dragline. However, they are equipped with precision controls that enable the operators to perform hair-splitting feats impossible with heavier and more cumbersome draglines, Mr. Hord said.

The digging or bucket end is hydraulically controlled with a "wristlike" action which allows the operator to shape ditches or dig excavations within an inch or less of the desired grade.

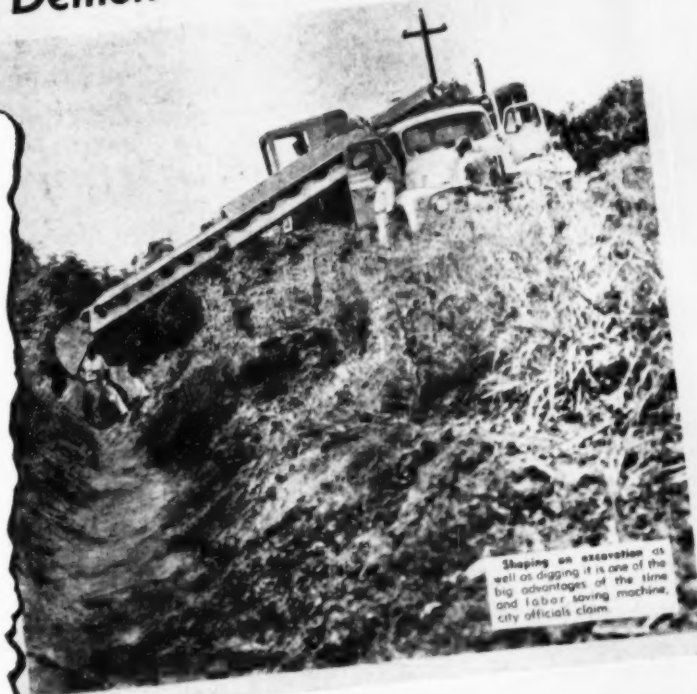
"With a dragline you are lucky to come within six inches of grade," Mr. Hord declares.

The machines are used not only for ditch digging and cleaning on which jobs they have proven to be a great labor saver, but also in digging trenches for sewer and water lines.

On both jobs, however, they not only save man power, but time as well. A crew of men working on ditches or trenches digs out the dirt, then tosses it on the side of the excavation, then has to pick it up later from that point and load it into trucks, Mr. Hord said.

"The new machines pick it out of the ditch—shape the excavation while doing it and toss it into a waiting truck—all in one sweep," he added.

"We haven't tried it yet, but I'm sure I could pick up a glass of water with it and hand the glass to you without spilling a drop," Mr. Hord said with a grin.



Shaping an excavation as well as digging it is one of the big advantages of the time and labor saving machine, city officials claim.

Street Repair Division Proud
Of New, Versatile Equipment

Gradall

DIVISION OF

Gradall Distributors
in over 75 principal cities
in the United States and Canada

**WARNER
&
SWASEY**
Cleveland
PRECISION
MACHINERY
SINCE 1886

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

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LIMA

Wheel or truck mounting is available on machines of $\frac{3}{4}$ and $1\frac{1}{2}$ yards capacity.



THE ALL PURPOSE MACHINE

Here are four typical examples of the versatility of the LIMA Type 604. Realizing that most contractors bid various types of work, LIMA has gone to great lengths to make a machine that is easily converted in the field to shovel, crane, dragline or pullshovel, thus giving the owner the advantage of four machines in one.

Versatility is but one of the many advantages that make the Type 604 a leader in its class. For instance, air controlled clutches do all the work—with one slight touch of the levers, the hoist, crowd, travel

and swing clutches can be engaged or disengaged, making for ease of operation. Anti-friction bearings in the drums and other important bearing points reduce destructive friction and lessens lubrication problems. Simplicity of design results in fewer working parts and greater safety for the operator.

For further information on the Type 604, write your nearest LIMA distributor or write to Baldwin - Lima - Hamilton Corporation Construction Equipment Division, Lima, Ohio, U. S. A.

CAPACITIES: Shovels $\frac{3}{4}$ to 6 cu. yds. Cranes to 110 tons. Draglines, variable.

OFFICES IN PRINCIPAL CITIES OF THE WORLD

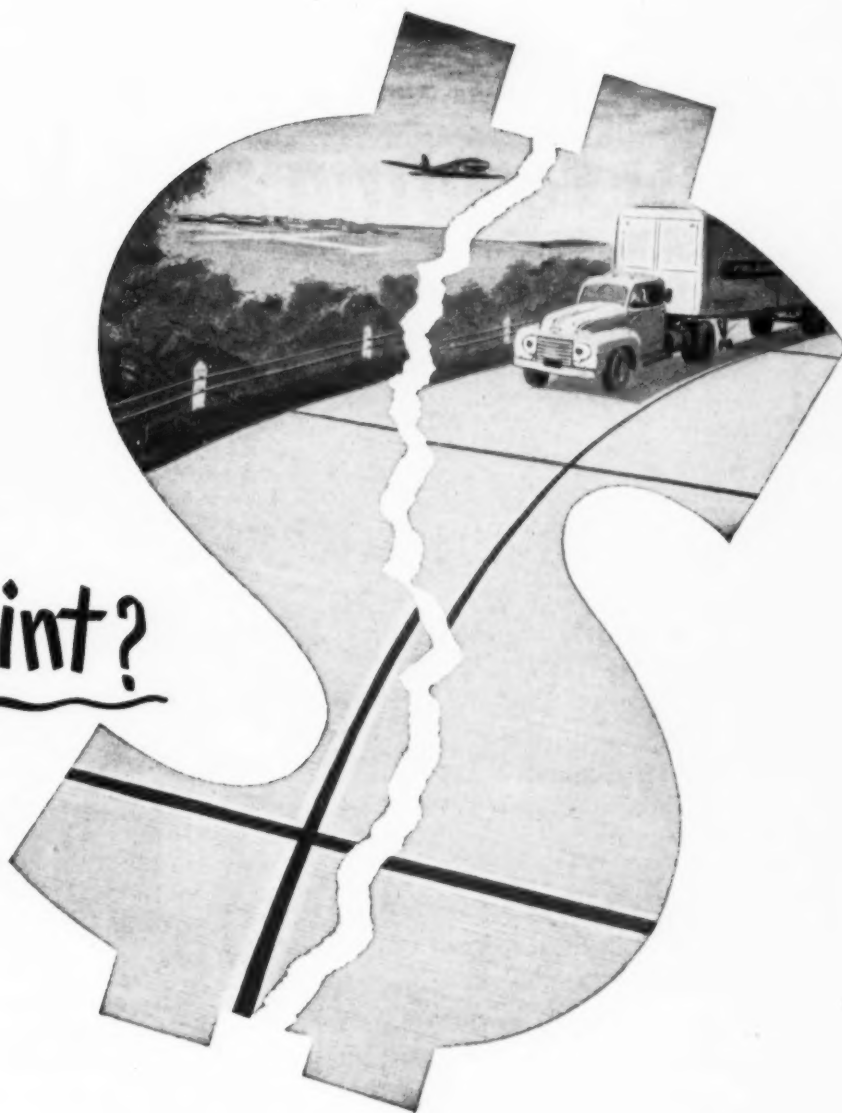
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SHOVELS • CRANES • DRAGLINES • PULLSHOVELS • TRUCK CRANES
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Are your
maintenance
costs

Out of joint?



Joint-sealing every year costs too much money . . . cuts deep into maintenance budgets. Put *one* application of FLINTSEAL* in your concrete pavement joints . . . and then forget those joints for years!

Unlike the old types of bituminous fillers which crack and leak in cold and flow and smear in heat, rubber-asphalt Flintseal stays put . . . remains extensible and compressible through expansion and contraction of the pavement slabs.

Seals out water—*positively* . . . yet is flexible and resilient . . . bonds to joint walls perfectly!

So don't take chances! Look at savings over the years by using Flintseal. Write for complete data. *Reg. U. S. Pat. Off.

THE FLINTKOTE COMPANY, Industrial Products Division, 30 Rockefeller Plaza, New York 20, N.Y.—55th & Alameda Sts., Los Angeles 54, Calif.

In Toronto, Ontario: THE FLINTKOTE COMPANY OF CANADA, LTD.

In London, England: Industrial Asphalts Company, Ltd.

For airports: Flintseal JFR (jet fuel resistant) is used to seal joints in airfield runways, taxiways, aprons and hangar floors.

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When writing advertisers please mention **ROADS AND STREETS**, August, 1953

"Nothing Like a Dorsey Low Bed" for Easy Loading and Handling



For easy loading and also for load stability, stub axles are mounted on walking beams.

Moving a bulldozer and crane from one small job to another calls for speed and efficient loading—and Rutledge Concrete Company of Richmond finds this Dorsey MTS meets these requirements at least two or three times a day. This trailer carries the machinery to speed the routine of installing septic tanks throughout a wide area served by Rutledge.

YOUR DORSEY DISTRIBUTOR HAS A HEAVY-DUTY TRAILER FOR EVERY SPECIALIZED NEED: LOWBOYS, TILT-TO-LOADS, FLOATS, PLATFORMS

Brown-Clark Equipment Co., of Richmond, Va., is one of the network of Dorsey distributors. See the Yellow Pages or wire us collect.



DORSEY TRAILERS • ELBA, ALABAMA



"WE CAN'T AFFORD TO WASTE TIME moving equipment from one job to another—and we find the highly maneuverable Dorsey MTS fits this situation perfectly. Even loaded to capacity it's easy to handle on the highway or in tight places."—says L. H. Newcomb, General Manager, Rutledge Concrete Products Company, Richmond, Va.



The versatile Oil Field Float

Tilt-to-Load



BARBER-GREENE HAS THE PORTABLE CONVEYORS YOU NEED

Here are three standard B-G Portable Conveyors together with B-G Car Unloader . . . all available for prompt delivery from your B-G distributor. These skillfully designed and ruggedly built machines will—within the limits of their capacities—provide you with the most efficient and economical

method of handling sand, stone, gravel, coal, coke, ashes, wet concrete, chemicals, bags and boxes.

In addition to the models shown, Barber-Greene also builds larger capacity portable conveyors. Why not check with your B-G distributor for complete information on portable conveyors?



MODEL 374. Heavy-duty. Pneumatic-tired—tow it anywhere. Full swiveling wheels. 18, 24 or 30-inch belt widths—33 to 60-foot lengths. Capacities to more than 425 tons per hour.



MODEL 363. Pneumatic tires and full swiveling wheels. 24-inch belt widths—25 to 35-foot lengths. Low clearance. Capacities to 200 tons per hour.



MODEL 362. Light-weight portable conveyor. Steel wheels (pneumatic-tired wheels also supplied, if desired). 18-inch belt width—20 to 30-foot lengths.

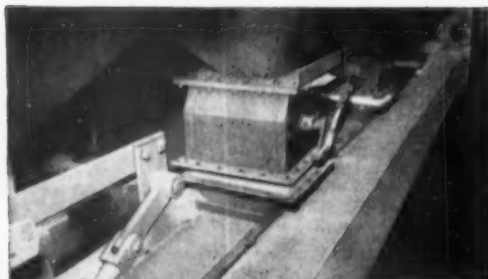
MODEL 358. Car Unloader. Perfect teammate for your B-G Conveyor. Pneumatic tired. Capacity up to 170 tons per hour. Maximum lump size is 4 inches.

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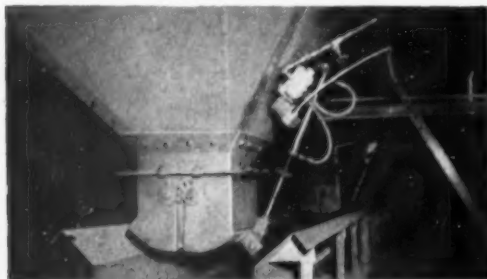
Aurora, Illinois, U. S. A.



ANOTHER LEVITTOWN and ANOTHER HELTZEL



Heltzel patented tubular valve eliminates jamming, has pin-point accuracy.



Double clamshell remote control aggregate gate adjustable to control speed.



Levitt's third Heltzel plant promises new concrete batching records for leading city builder.

famous city builder sets third HELTZEL plant into operation at fabulous Bucks County development

Down in Bucks County, Pennsylvania, William J. Levitt, head of the city building firm that bears his name, recently set into operation his third Heltzel concrete batching plant. The fact that his two previous Heltzel plants set record-smashing production records convinced him of Heltzel's ability to produce. In fact, the first plant played a big part in

helping him astound the construction world with his Long Island Levittown. It batched concrete on an average of 1800 cubic yards per day, and on occasion rang up amazing 2,000 yard plus days. His second Heltzel plant was used mainly in the construction of concrete blocks, and untiringly kept pace with the fastest concrete block production on record.

This new Heltzel plant promises even greater things. It's completely integrated—from supply hoppers to conveying equipment to automatic batcher—it's completely designed and built by Heltzel to give Levitt the nation's most efficient concrete batching. Its capacity is an astonishing 300 cubic yards per hour, it's fully automatic with high speed electronic batching that is accurate to the fraction of a pound; the entire operation is controlled from a central control area, and it bristles with many other new Heltzel exclusives that put an end to guesswork and human error in concrete batching.

Portable or stationary, large or small—if you want the finest in modern batching equipment get the Heltzel story before you buy. Heltzel engineers will be happy to work with you in developing just the plant you need for your operations.



Clean line, all-welded A-frame comes completely assembled, easy to erect.

The Heltzel Steel Form and Iron Co., Warren, Ohio

Another New Installation



for glarefree concrete
roads,
sidewalks, walkways

AE DISPERSED BLACK

in monolithic
or topping concrete

Horn AE Dispersed Black is used in air entrained or ordinary concrete for darkening surfaces of concrete highways, center islands, sidewalks, walkways and concrete floors. Such surfaces absorb heat and reduce ice build up and driving hazards and improve visibility. Darkened store sidewalks reduce window glare and increase the visibility of store displays and merchandise. AE Dispersed Black does not in any way counteract the beneficial effects of an air-entraining agent. Used by Government, State and Municipal Highway Departments. Send for full information today.



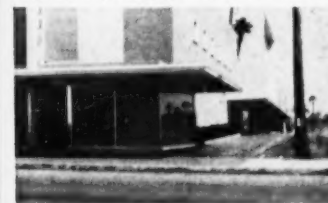
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Goldblatt's Department Store, Chicago, Illinois



Boys Market, dark grey interior store floor



Sears, Roebuck, San Diego, California

Boys Market
AE Dispersed Black sidewalk
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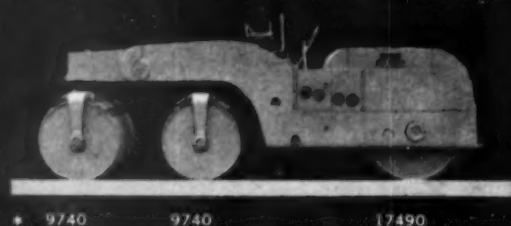
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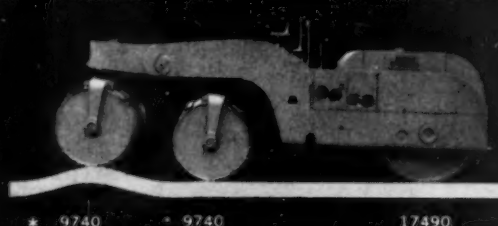
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THIS IS WALKING BEAM COMPACTION CONTROL:
Both guide rolls are suspended from a single rotating beam. When the beam is "semi-locked," the end guide roll can pivot above but not below its normal position.

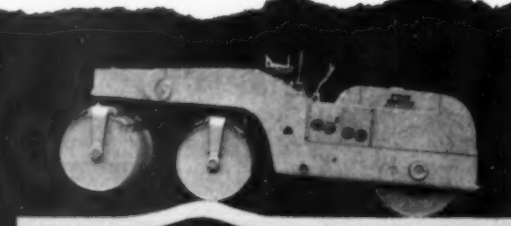
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When the first guide roll encounters a high spot in the fresh material, the Walking Beam rotates to permit the roll to pass over the hump exerting only normal pressure. This "prepares" the material for the high compaction of the center roll.

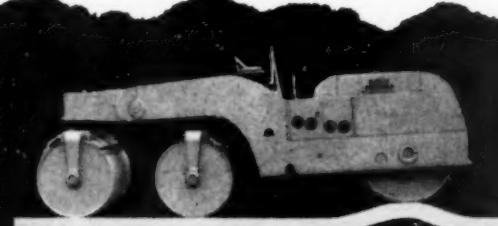
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NOW... A new 3-Axle Tandem with WALKING BEAM COMPACTION CONTROL



Then the center guide roll rises on the hump. The "semi-locked" Walking Beam causes the entire guide end of the roller to rise with the center roll. This lifts the end guide roll off the ground, transfers its weight, along with some of the weight of the drive roll. At this instant, the center roll exerts almost 3 times its normal compaction.

3



The drive roll exerts its normal compaction as it passes over. The Walking Beam can be used unlocked for rolling vertical curves and warped surfaces. Can also be used fully locked, if desired.

4

*Working Weight With Water Ballast in All Rolls, Lbs.

In 1936, Buffalo-Springfield introduced the world's first practical 3-axle tandem. Now Buffalo-Springfield engineering has further developed this revolutionary roller to give you Walking Beam Compaction Control. With the new Walking Beam design used in the "semi-locked" position, extra compactive effort is actually applied to high spots only. This initial leveling action *does away with the need for cross rolling,*

eliminates extra job time and possible damage to material that has been compacted and set.

Using Buffalo-Springfield 3-axle tandems has meant as much as **60% higher tonnage compacted** per day than with 2-axle tandems. Many states specify fewer rollers, less rolling time if 3-axle tandems are used. Save labor costs and capital investment. Roll better roads faster — the 3-axle, Walking Beam way!

There's a Buffalo-Springfield Distributor conveniently located to serve you.



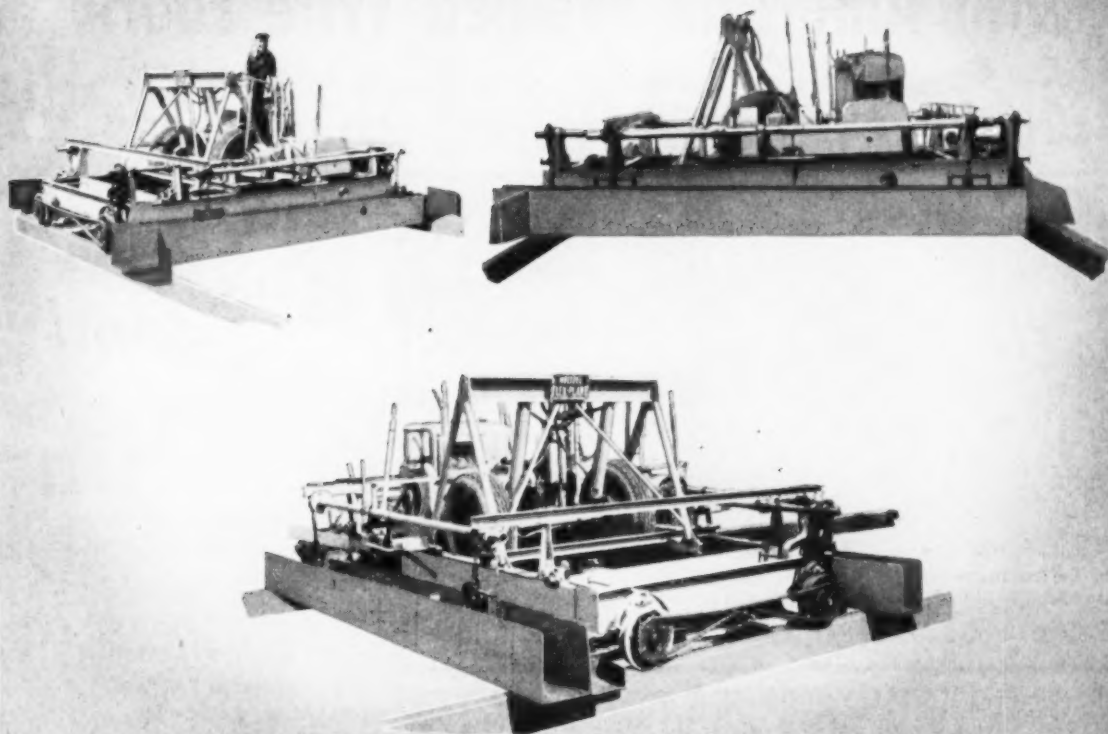
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MANUFACTURER OF ROAD ROLLERS



Send for new
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BUFFALO-SPRINGFIELD ROLLER COMPANY
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YOU'RE LOOKING AT THE MOST MOBILE CONCRETE FINISHER IN THE WORLD

Here are three views of one of the most heralded machines in highway and airport construction history. It's the super portable Flex-Plane Detroit Special Finishing Machine.

Wherever one of these machines is in operation you'll discover the contractor using

the machine has been able to work faster at less cost.*

Completely portable, the machine will lift itself from the forms and convert itself into a "trailer" in a minute . . . ready to be taken to the next job with a minimum of make-ready and idle crew time.

THE SUPER PORTABLE FLEX-PLANE DETROIT SPECIAL

Special screeds and screed mounts enable this speedy machine to finish any type surface in the manner specifications call for. Both screeds are mounted outside the frame which permits faster screed changes. Machine is telescopic . . . can be altered to fit any size job in approximately 15 minutes. If you are in the business of building concrete streets, highways or landing strips, you can't afford to overlook this cost-cutting finisher. To get all the facts drop a note on your company letterhead to the Flexible Road Joint Machine Company, Warren, Ohio, today.

* Ask for name of contractor nearest you operating a Detroit Special—talk to him about the quality of work, the speed and the savings he has been able to get by using this great machine.



Keep up your road building reputation with American Welded Wire Fabric



IN THE STRIKE-OFF METHOD of construction being used above, flat sheets of American Welded Wire Fabric are easily laid down by two men. This is done quickly and does not delay final pouring. American Welded Wire Fabric increases the strength of concrete slabs and assures long-lasting roads.

*It reduces
cracking...
Keeps roads
smooth!*

REINFORCED concrete slabs can be built with less joints if they are built with American Welded Wire Fabric reinforcement. This prefabricated reinforcement distributes loads evenly throughout the slab. And if cracks do occur, no structural damage is done to the reinforced slab. The crack cannot widen because the fabric binds the cracked portions together. If no fabric is used, concrete at or near the cracks will soon become over-stressed and break up.

You can build these advantages into your roads at low cost. The strength which American Welded Wire Fabric gives to concrete permits you to use longer slabs with fewer joints, insuring a smoother riding surface and less maintenance costs for joints.

Write to our nearest sales office for complete information. Ask for a free copy of the American Welded Wire Fabric Catalog.



AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO
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EVERY TYPE OF REINFORCED CONCRETE CONSTRUCTION NEEDS

U.S.S. AMERICAN WELDED WIRE FABRIC

UNITED STATES STEEL



TRUCK OWNERS!

You tell us what your present truck is worth in trade on a brand-new DODGE



Dodge trucks give you:

7 great engines with 100 to 171 h.p. • Advanced braking • No-shift Truck-o-matic transmission available in $\frac{1}{2}$ -, $\frac{3}{4}$ -ton models • Shorter turning than competitive makes • Unusually low loading height • Completely rust proofed sheet metal • Full-vision, solid-comfort cabs.

Save money every mile with

DODGE
"Job-Rated"
TRUCKS

Fill in the appraisal form below, mail it to your Dodge dealer! He's anxious to trade and will do his level best to meet your terms!

No cost, no obligation!

Here's your chance to make the trade of a lifetime on a brand-new Dodge "Job-Rated" truck! And there's no dickering, no beating about the bush! Just do this:

Decide what you believe your present truck is worth. Put your trading price on the appraisal form below, tear out the form and mail it to your Dodge dealer. He's anxious to trade, and will do his level best to meet the price you put on your present truck. If he can't meet your price, there's absolutely no obligation. If he can, you've got a "name-your-own-price" deal! You've everything to gain, nothing to lose, so mail the appraisal form today!

Cut out and mail this appraisal form to your Dodge dealer!

or phone in the information

(See Classified Section of Telephone Directory for address)

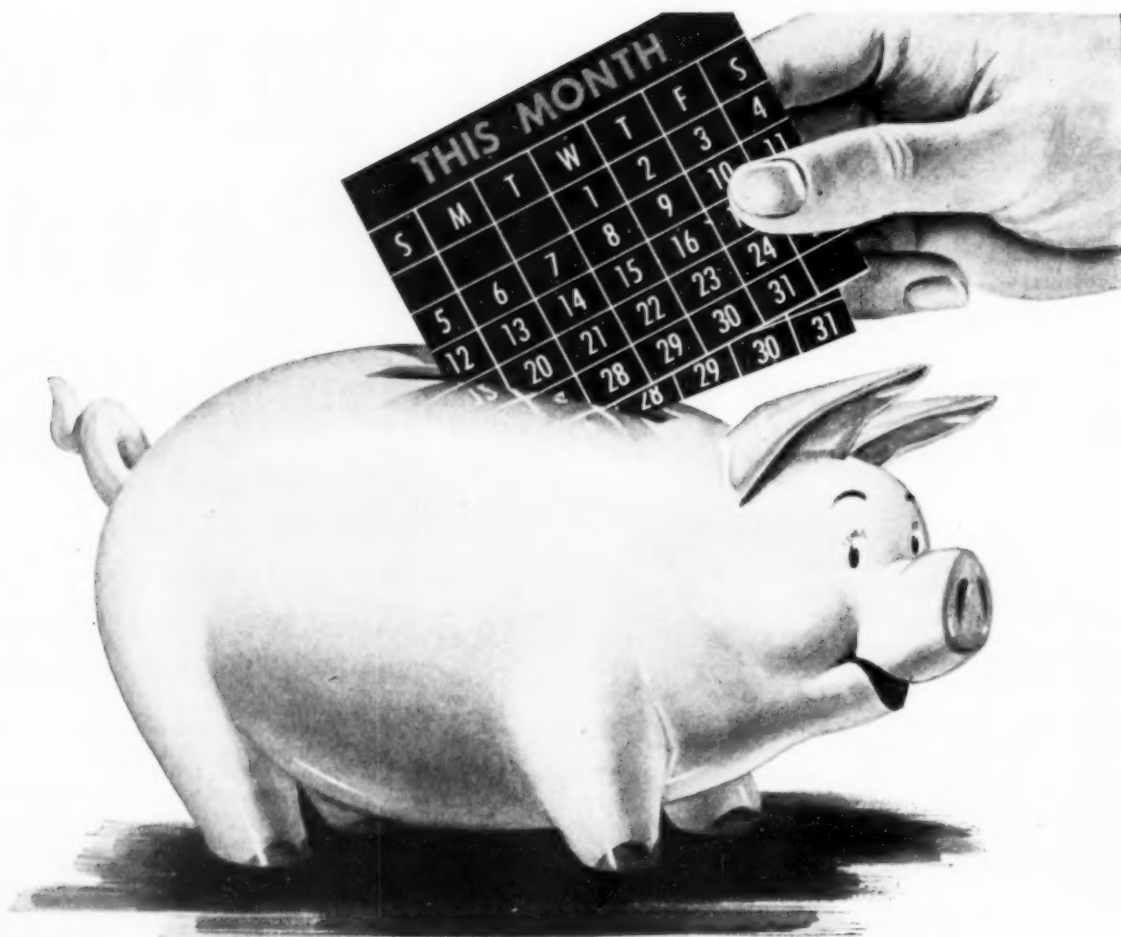
I have a _____ truck, in _____
(year, make, model) (good, fair, poor)

condition. I think it is worth \$ _____ in a trade.
I understand that you are not obligated to meet this price,
nor am I obligated to accept it.

Name _____

Mailing Address _____

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SAVE TIME... only one week needed for new **SOIL-CEMENT** testing procedures

New short-cut procedures for determining the cement factor in soil-cement construction in sandy soils have been devised by the Portland Cement Association. They save five of the six weeks formerly needed for tests.

The 2,229 sandy soils from the U.S. and Canada previously tested according to standard ASTM-AASHO procedures were analyzed. This analysis showed a correlation between cement factor requirements and (1) maximum density, (2) combined silt-clay content and (3) compressive strength.

Based on these relationships the new procedures provide reliable methods for determining safe cement factors in one week for most sandy soils. In

one day one laboratory man can perform all tests needed for most samples except the one for compressive strength. That takes seven days. And much smaller soil samples suffice, too—usually from 60% to 75% less than was formerly required.

Since the advent of scientifically controlled soil-cement construction nearly 20 years ago, more than 6,000 different soils have been tested. For the sandy soils short-cut procedures are now ready.

Investigate this quick, simple method of obtaining cement factors in soil-cement construction. Write for your free copy of a new booklet, "*Short-cut Soil-Cement Testing Procedures for Sandy Soils.*" It is distributed only in the U.S. and Canada.

PORTLAND CEMENT ASSOCIATION

DEPT. A8-28, 33 WEST GRAND AVENUE, CHICAGO 10, ILLINOIS
A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work



"Shovel loader" gave us
4 more workers without
increasing payroll!"

Sioux Falls Construction Co.



It took five men to shovel sand and aggregate onto a conveyor belt feeding the weigh batch mixer to keep this company's cement mixer charged. Now *one man* does it with a Lull Shovel loader, and four men have been put on other work, where they were badly needed.

Besides this, the Shovel loader serves as a portable crane for hoisting stone, mortar, steel beams, etc. to second story levels. It unloads lumber, steel beams and other material. With a bulldozer attachment it levels and backfills.

This Lull Shovel loader is a Model 4-BHL, with lifting height of 14 feet, dumping height of 12 feet, and $\frac{3}{8}$ yard material bucket. No other low cost highly maneuverable loader of this type has sufficient lift to charge these batching machines.

"\$10,000 wouldn't buy this machine from me if I couldn't replace it", says the contractor.

Lull Shovel loaders mount on Case, Minneapolis-Moline, Oliver and Sheppard Diesel tractors. Bulldozers, cranes, snow-buckets, forks or sweeper attachments are easily added.

write for

Bulletin Ad-32B or contact your Lull distributor for complete information.

THE BAKER-LULL CORPORATION
Formerly the Lull Manufacturing Company

335 WEST 90th STREET • MINNEAPOLIS 20, MINN.
A Subsidiary of the Baker-Raulang Co., Cleveland 2, Ohio

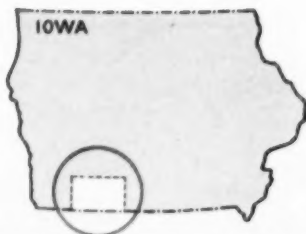
**Baker
Lull**

handling equipment

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25

Taking Iowa



RINGGOLD COUNTY has 935 miles of county roads. This is the location of farm to market road construction done by the International Crawler fleet of Easter & Schroeder, Inc.

**Pick Your Site and Set Your Hour...
We'll Demonstrate Our Tractor's Power**



"IDEAL FOR FARM-TO-MARKET ROAD CONSTRUCTION," say Joe Easter and Don Schroeder (above). "In our eight month's working season, our five TD-18A units, with the sixth as a pusher, moved approximately 540,000 cubic yards, with minimum downtime."



ROAD BUILDING PRODUCTION LINE! Part of the Easter & Schroeder fleet of International crawlers on a regrading job in Ringgold County, Iowa. On this seven-mile stretch they moved 78,000 cubic yards in three weeks' time. *"We move it that way all the time,"* say the owners.



TD-24



TD-18A



TD-14A



TD-9



T-9

to Town

Farm-to-market roads get big boost fast from the International Crawler fleet of Easter & Schroeder, Inc.

The dirt flies when Easter & Schroeder, Inc., move in with their fast, powerful fleet of International crawlers... and Iowans can get to town and back in time to do the milking. For these Griswold, Iowa, contractors specialize in farm-to-market roads in the tall corn state.

Take the seven-mile job in Ringgold County, Iowa, you see here. In three weeks' time, Easter and Schroeder moved 78,000 cubic yards of dirt to give the road a 24-foot top on a 66-foot right of way.

Easter and Schroeder came to this Ringgold County job from one in Taylor County, where they moved 35,000 cubic yards of dirt on a two-

mile stretch, completing the job in six 11-hour days.

"After 25-years' experience working in dirt, we settled on a crawler fleet one hundred per cent International," say these contractor partners. The fleet now consists of six International TD-18As with scrapers and 'dozers and a TD-14A with tamping roller.

Do you want speed and dependable economy under tough conditions? Then get in touch with your International Industrial Distributor, for all the facts on Power that Pays!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

POWER
THAT PAYS

INTERNATIONAL



INTERNATIONAL
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SEVEN GREAT INTERNATIONAL CRAWLERS...EACH WITH
MATCHED EQUIPMENT FOR EVERY JOB



FLOOR SLABS



ROOF SLABS



BRIDGE SLABS

Now...You Can Form CONCRETE SLAB VOIDS

at low Cost!

Save CONCRETE!
Save STEEL!
Save MONEY!

with



LAMINATED FIBRE TUBES

Low cost SONOVOID fibre tubes were specifically designed for use in concrete roof, floor, wall and bridge deck slabs. SONOVOID creates a void, thereby lightening the slabs for economy and ease of handling, by displacing the concrete near the neutral axis which does little work. SONOVOID permits the pre-fabricating of prestressed and poststressed slabs—saves concrete and reinforcing steel. Sizes, 2" to 36.9" O.D., up to 24 feet, or longer on special order. Can be sawed to lengths on job.



Write Today for Details!

SONOCO PRODUCTS COMPANY

Construction Products Division

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AKRON, IND.

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DISTRIBUTORS WANTED—Write for complete information.

**high
production
on
Turner
Turnpike
with...**

★ "Eucs" on the Turner Turnpike averaged over 13 m.p.h. for the loaded haul. Top speed of 28.2 m.p.h. with full payload means more trips per hour.



Euclid SCRAPERS

On a section of the new Turner Turnpike between Tulsa and Oklahoma City, Amis Construction Co. had a really tough job for scrapers—hard clay and sand rock.

Despite the difficult digging, three "Eucs" of 15.5 cu. yd. struck capacity averaged 375 bank yards per hour on a round trip of 3,020 feet, enabling the contractor to complete this work ahead of schedule.

Easy loading, high travel speed, and fast dumping here proved what contractors have learned on many other earth moving projects—that for day-in and day-out performance you can't beat Euclid Scrapers.

Your Euclid distributor may be able to show you how Euclid equipment can step up production and lower costs on off-the-high-way moving of earth, ore, rock and coal. Have him show you performance figures on work similar to yours.



★ Positive, fast acting hydraulic controls permit spreading the load in thin, even layers. Roll-out ejector dumps all types of material fast and clean.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



PRESTRESSED CONCRETE



1 Plant of Prestressed Concrete of Colorado, Inc., includes a 280-ft. casting bed, 10 ft. wide. Two hydraulic jacks have a total stressing capacity up to 300 tons. Photo shows forms for a "T" beam in place on the bed.



2 Side view of pretensioning bed showing removal of a 39-ft. "T" slab. This picture and that at the left show intermediate stub columns, 20 ft. apart, behind which portable anchorages can be dropped.



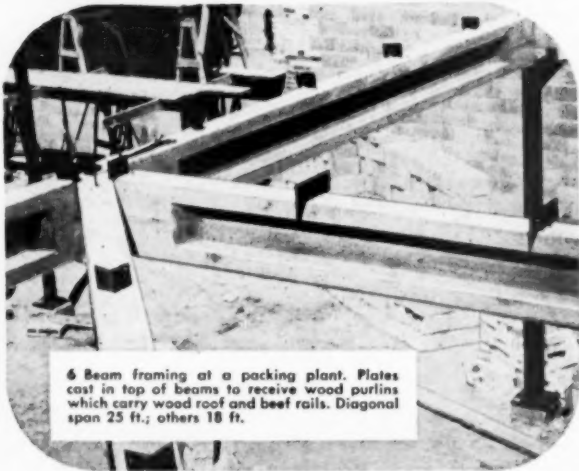
3 Truck delivering prestressed beams to the construction site where they are erected directly from the truck to provide a finished structure in shortest time.



4 Erection of a 39-ft. "T" slab during building construction. Crane placed slab over wall of ramp. Then "A" frame lifted one end while crane lifted other to swing slab in place — a method necessitated by insufficient bearing for crane outriggers in alley.



5 Lifting a 50-ft. "T" slab into position.



6 Beam framing at a packing plant. Plates cast in top of beams to receive wood purlins which carry wood roof and beef rails. Diagonal span 25 ft.; others 18 ft.

PRODUCTION LINE !

Single plant quickly reached daily volume of 1120 ft. of structural members to meet demand

ALMOST UNLIMITED POSSIBILITIES await the fabricator of prestressed concrete structural members. One of the first in this field, Perlmutter & Sons Co., of Denver, built a 48-ft. casting bed as a pilot plant. They cast a wide variety of shapes and sizes and learned the angles. Then, as Prestressed Concrete of Colorado, Inc., they built a 250-ft. casting bed. Completed last October, this plant produced 560 linear ft. of beams, girders, roof and floor slabs daily. By February this was increased to 1120 ft.

By June 1, 1953 Prestressed Concrete of Colorado had supplied 130,347 sq. ft. of 100% prestressed concrete roof plus beams to support an additional 25,700 sq. ft. of wood and lightweight slab.

Both casting beds were designed by Phillips-Carter-Osborn, Inc., of Denver, after consultation with Roebbling. Six different architectural firms in the area have employed them to design the prestressed concrete members for many structures including the three illustrated on these pages.

Roebling has pioneered in adapting the principles of prestressed concrete to American practices. Roebling is a major supplier of strand for pretensioning—in Regular and SR (stress-relieved) grades—and of end fittings and strand for post-tensioning.

Based on its experience in this field, Roebling can furnish data and suggestions on the design and operation of plants for fabricating prestressed concrete structural members. Inquiries will be welcome from everyone interested in building such plants and in capitalizing on the most revolutionary and profitable trend since structural steel came into the picture. Prestressed concrete compares favorably with steel cost-wise, and its unique advantages assure a practically unlimited future.

Architects, engineers and builders are invited to write for the Roebling prestressed concrete story.

Address Prestressed Concrete Dept.

JOHN A. ROEBLING'S SONS CORPORATION
Trenton 2, New Jersey

A subsidiary of The Colorado Fuel and Iron Corporation



7 Placing a double "T" slab during erection of a cold storage plant. Average placement time was three minutes per slab.



8 Same as above. Top view of slabs in place before the lifting hooks were burned off.

ROEBLING

ATLANTA, 734-3400 N. W. 11TH ST. WILSON, ST. SWEETEN ST. &
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17TH ST. & 17TH ST. 1300 1ST
W. 11TH ST. 1000 1ST ST. 1000 1ST
MARK BLVD. & 1000 S. 1000 S.
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SALLEN OFFICE, TRENTON
2. NEW JERSEY

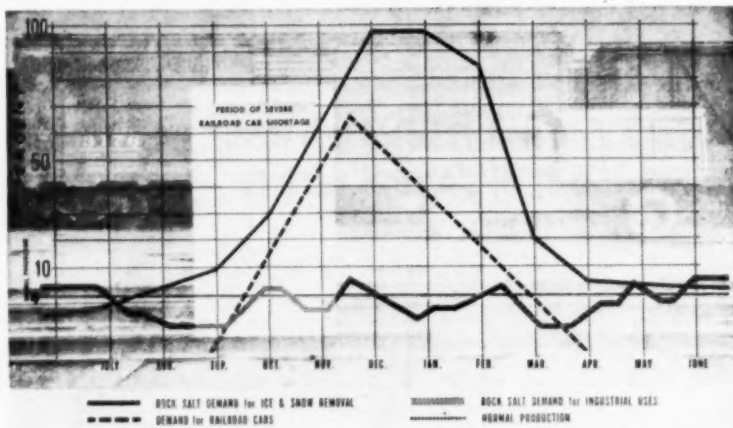


Cayuga Rock Salt

Don't wait till snow falls and delivery's SLOW—With SALT, RAYN-SHED, TARCO, be ready to GO!

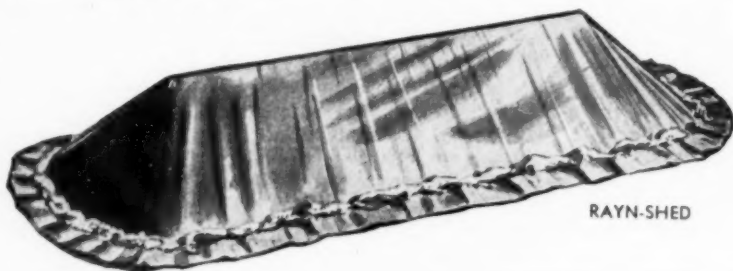
Better buy your supplies Before the snow flies!

If you wait until fall or winter, when transportation loads are at their peak, delivery may take 12 weeks or more. Look at the chart. Note the terrific demand for Rock Salt from September to March. Note also the shortage of freight cars during October, November and December. December's the month when you'll be wanting your Rock Salt in a hurry, to prevent costly skids on icy pavements. So—to be on the safe side, lay in your supplies of Rock Salt NOW.



Put your Rock Salt to bed In a handy RAYN-SHED

Stored under RAYN-SHED, your salt will be kept in good condition ready for immediate use when needed. RAYN-SHED is a durable, watertight, weather-resistant vinylite plastic sheet. Standard-size strips, sewed together, will cover salt piles of from 2 to 20 carloads.



RAYN-SHED

To SPREAD salt, all say This machine's the best way



For correct application of Cayuga Rock Salt we recommend the TARCO "Scotchman" Salt Spreader. Apply 300 to 400 pounds of salt, depending upon road conditions, and you'll be amazed at how fast you obtain bare, safe pavements.

COMPARATIVE COSTS OF PROTECTING ICY HIGHWAYS With TREATED SAND With CAYUGA SALT

(Sand mixed with sodium chloride)

Cost per cubic yard:

Royalty	\$0.10
Loading	.25
Haul, 5 miles at 8c.	.40
Piling with bulldozer	.15
Treating with salt (50 lbs.)	.48
Reloading at time of storm	.25
Average haul, 10 miles at 8c.	.80
Spread	.10

Total cost per cubic yard.....\$2.53

Cost per mile (3 cu. yd. at \$2.53).....7.59

Cost per 5-ton load:

5 tons bulk salt at \$12.95 per ton	\$64.75
Loading, 5 tons at 25c per ton	1.25
Average haul, 5 tons, 30 miles at 8c per ton mile	12.00
Spread (mechanical) 5 tons at \$1.00	5.00

Total cost per 5-ton load.....\$83.00

This is the cost for 25 miles of road.....83.00

Cost per mile (\$83.00 divided by 25).....3.32

\$7.59 cost per mile with treated sand

3.32 cost per mile with Cayuga Rock Salt

\$4.27 SAVINGS per mile with Cayuga Rock Salt

This report is from F. Ray Williams, Superintendent of Highways, Saratoga County, N. Y. Total mileage of state highways in this county: 216 miles. Estimated savings, each storm, 216 x \$4.27, or \$922.32.

CAYUGA ROCK SALT CO., INC., MYERS, N. Y.

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Phone: Sullivan 57

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Providence, R. I.
Phone: Dexter 1-7279

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Phone: 9-5601

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Phone: 2-0718

The Chemical Corp.
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Phone: 6-3223

The Chemical Corp.
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Phone: Liberty 2-7171
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Concord, N. H.
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The Chemical Corp.
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South Portland, Maine

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Chas. Schoefer & Son
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Elizabeth 3, N. J.
Phone: 2-7010

Watkins Salt Company
Watkins Glen, N. Y.
Phone: Watkins 13

Harvey Salt Company
415 Guildford Avenue
Baltimore 2, Maryland
Phone: Saratoga 5030

Southern Salt Company
222 West Main St.
Norfolk 1, Virginia
Phone: 2-4638

Salt Service, Inc.
128 E. Challen Avenue
Reading R.R. Freight
Term. (Germantown)
Phone: Tenn. 9-6938—39
Philadelphia 44, Penn.

Industrial Salt Service
Div. H'way M't's Co.
Grafton, New York
Phone: Grafton 154

Industrial Salt Service,
Inc., P. O. Box 115
Carlton Hills, N. J.
Phone: Rutherford, N. Y.
4-1266

Industrial Salt Service
Lehigh Salt Service
Lehigh Court (Old
L.V.R.R. Round House)
Niagara Falls, N. Y.
Phone: 4-2297

Industrial Salt Service
of Canada, Ltd.
Montreal, Quebec, Can.
Toronto, Ontario, Can.

E. J. Fedigan, Inc.
Anderson & Isabella Sts.
N. S. Pittsburgh 12, Pa.
Phone: Cedar 1-6766

Youngtown Building
Material & Fuel Co.
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lets you put more on the hook — apply more power at the tooth point. It means greater safety — greater speed — greater work capacity. It's fully convertible, of course. Ask your P&H dealer for complete details about MITI-MITE. Write for literature.

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FROM THE MOST COMPLETE AND DIVERSIFIED
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CONCRETE BUCKETS

FOR NORMAL OR LOW SLUMP CONCRETE FOR GENERAL CONSTRUCTION WORK

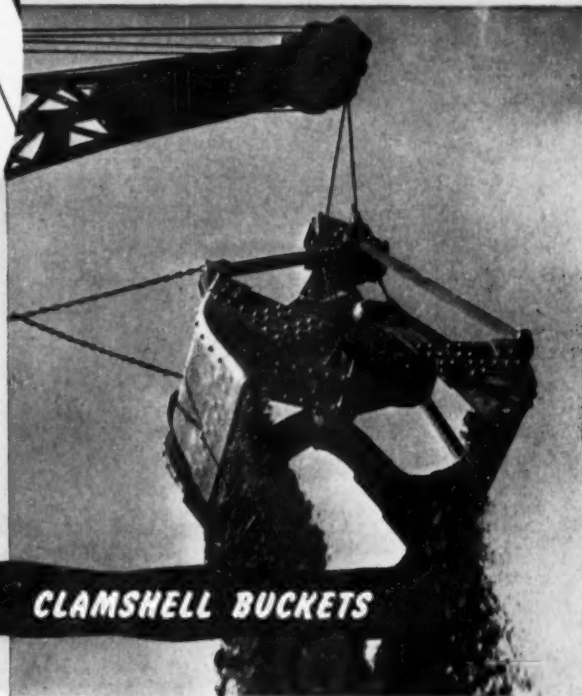
Blaw-Knox Roller Gate Controllable Discharge Concrete Buckets for use on crane or cableway can be easily opened or closed by one man, with a full or partial load of concrete. Will handle grout without leakage or the stiffest concrete with the same positive control. Sizes range from 1 to 8-cu. yds.

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The Blaw-Knox CAC Concrete Buckets with air-operated clam gates are designed for high speed, economical operation on big-job specifications. They're specifically built for low cost handling and placing of harsh, low slump concrete containing coarse aggregate and air-entraining agents. Furnished in 2, 3, 4, and 8-cu. yd. sizes.

FOR EVERY JOB CONDITION . . . fluid or dry concrete, big aggregate or normal stone, any specification . . . there's a size and type of Blaw-Knox Concrete Bucket to speed your work and cut concrete placing costs. Tremie type buckets for placing concrete under water also available from 1 to 8-cu. yd. capacity.

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You can increase your crane output by using the clamshell bucket that's built for the job. Whether it's handling all classes and types of aggregates, dredging, barge clean-up—for hard digging or general purpose use, there's a Blaw-Knox Bucket that will give you the most profitable crane output on any specific operation. That's why so many contractors use Blaw-Knox engineering service—backed by many years of experience in clamshell bucket application—to help them select from the wide variety of sizes, weights and types, the bucket that meets all their requirements. Let us help you increase your crane output, too.

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Says Superintendent of a Leading Florida Rock Producing Company*



Dragline drainage ditching jobs, like this one in Michigan, call for extra flexible, extra tough Tuffy Draglines.

Longer Service Life of Tuffy Results in Big Savings On Rock Crushing Jobs

"On our first comparison test, Tuffy Draglines went 26 shifts against 19 shifts for the make we had previously been using. Our second test proved even more conclusive: 19 shifts for Tuffy, 9 shifts for the other make. Now we use Tuffy Drags 100%."

These tests were conducted by a construction company that operates 33 draglines in their plants. By their own tests, they proved that Tuffy's extra flexibility, extra abrasive resistance, and extra toughness helped them cut dragline costs 40%. Discover for yourself how Tuffy Draglines can move more material for longer periods to help you reduce handling costs.

*(name on request)

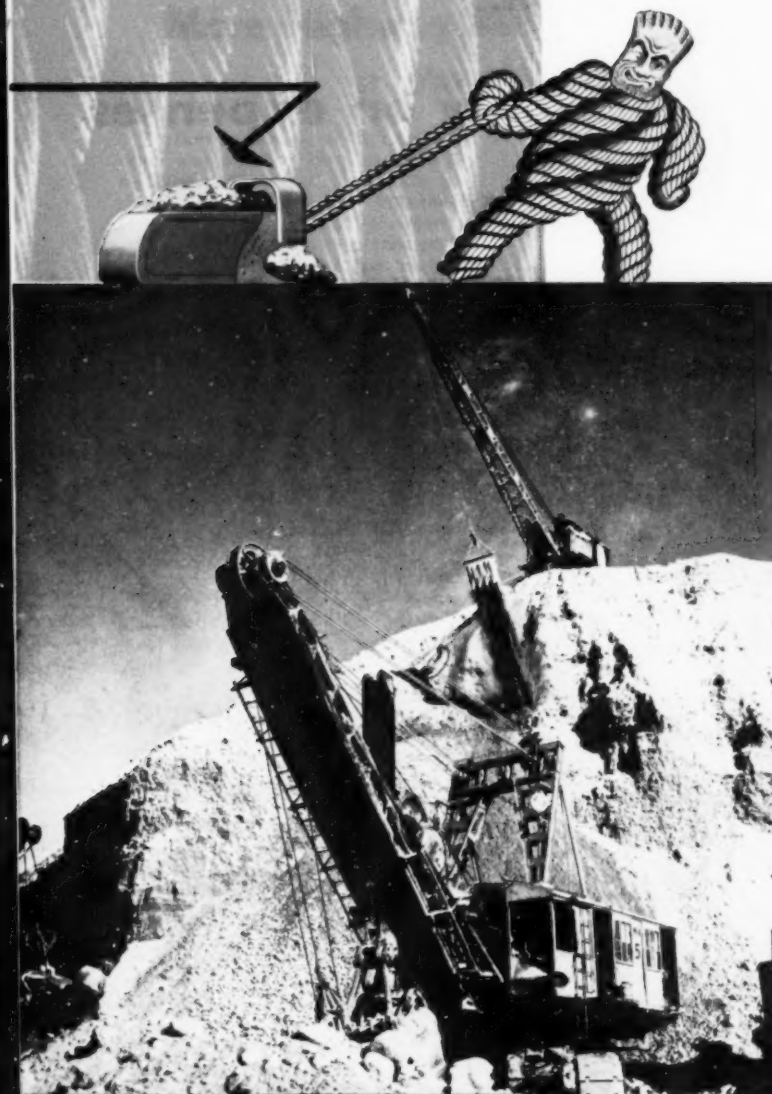


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Moving a mountain of sand and gravel laid down by a glacial stream thousands of years ago requires skill plus equipment you can count on. You can count on Tuffy Draglines for greater abrasive resistance and reduced handling costs.

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No need to throw away 40' to 50' of good rope when 10' or so is crushed or cut. With a reel of Tuffy Dozer Rope, mounted on your dozer, you feed only enough through the wedge socket to replace *only* the damaged part . . . get up to 300% increased service! And, you can make the cut and have your dozer back at work in less than *half* the usual time!



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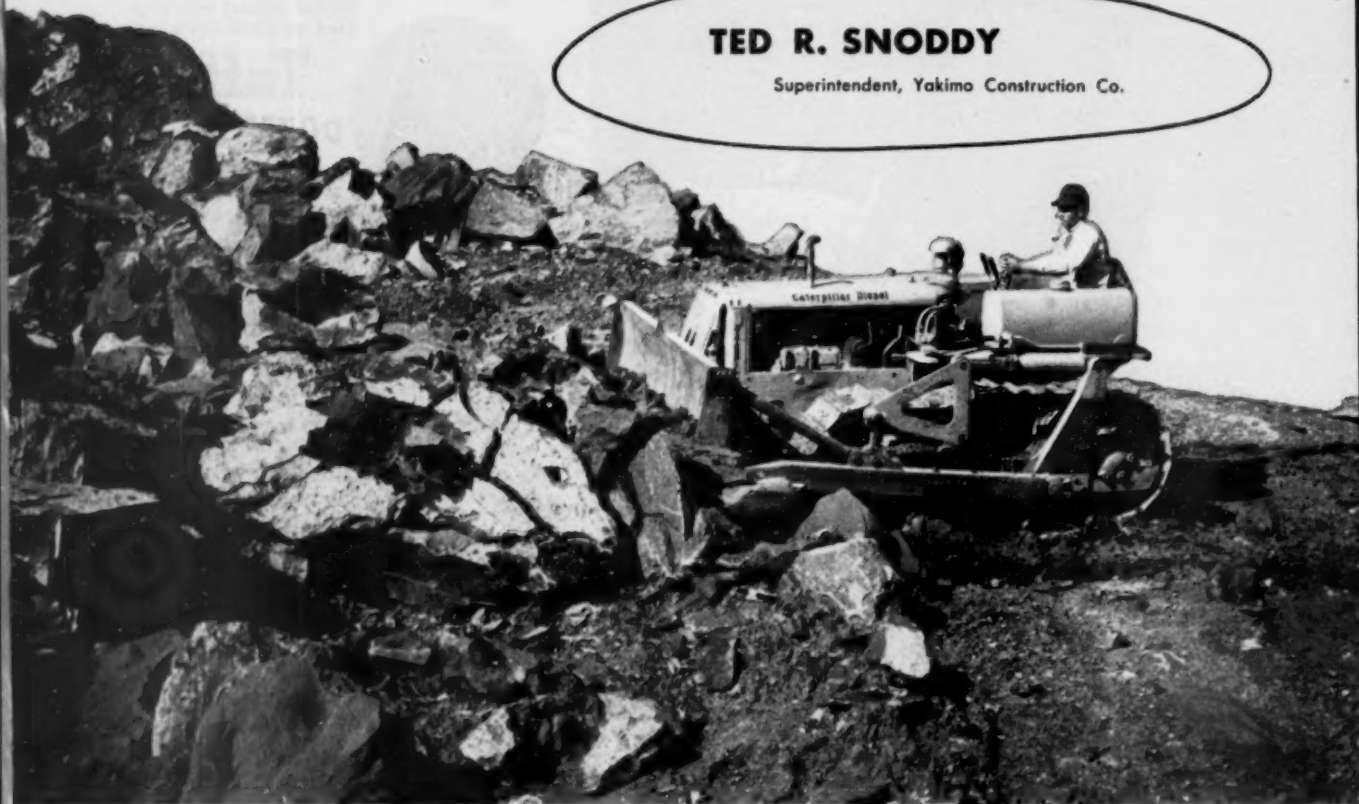
"When I bought this **CAT*** D4 Tractor,
it took the place of 20 men.

"It saved me about \$100 a day on expenses.

"This tractor has paid for itself
about four times and no repairs."

TED R. SNODDY

Superintendent, Yakimo Construction Co.



A Caterpillar D4 Tractor equipped with a No. 4S Bulldozer clears rock in the quarry for easy access by trucks. Owned by Yakimo Construction Co., Dallas, Tex., this equipment is working on the Blakely Mt. Dam, Mt. Pine, Ark. The Yakimo Construction Co. has the rock job for the 4,500,000-yard dam.

What else is there to say?

The money-saving performance of this Caterpillar D4 Tractor and No. 4S Bulldozer speaks for itself. Ask your Caterpillar Dealer for a profit-building demonstration on *your* job.

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YOUR DEALER
WILL DEMONSTRATE**

Roads and Streets in the News

More Highway Revenues Enacted in Many States

Further extension of highway-user taxes and highway bond issuance has resulted from state legislative sessions this year, as the lawmakers faced up to the mounting economic importance of highway transportation and the demand for highway modernization.

New increases in gasoline tax rates were enacted in California, Iowa, Maryland, Nebraska, and Ohio. Similar bills, however, were vetoed in Utah and killed in 17 states.

Legislation extending added gasoline taxes imposed on a "temporary" basis was enacted in Colorado, Kansas, Nevada, Oklahoma, Pennsylvania and South Carolina.

Truck operators will pay higher taxes in a number of states, but were spared, at least temporarily, from a threatened general wave of new ton-mile taxes.

A ton-mile tax on trucks was voted in Ohio, ranging from $\frac{1}{2}$ cent to $2\frac{1}{2}$ cents per mile on trucks with three or more axles. This tax covers trucks of about $11\frac{1}{2}$ tons or more on 3 axles. The ton-mile tax was rejected in 18 other states.

Bills providing for replacement of ton-mile tax laws with new systems of truck taxation were enacted in Idaho and Wisconsin, but application of New York's weight-distance tax statute was broadened.

Other types of truck taxes or registration fees were boosted in California, Maryland, Montana, Nebraska, North Dakota and South Dakota, and reduced in Illinois and New York.

States in which higher registration fees for passenger cars were enacted include California, Maryland, Nebraska and South Dakota.

Many Bond OK's

Proposals for new bond issues or other forms of borrowing to finance free highway construction were given legislative approval in Maryland, New Hampshire, North Dakota, Oregon, Tennessee and Washington; killed in California, Colorado, Idaho, Oklahoma and Vermont, and await final legislative action at this writing in Delaware, Ohio and Pennsylvania.

Legislation providing for new studies of highway financing and related problems were enacted in a number of states, including Arizona, Florida, Minnesota, New Jersey, West Virginia and Wyoming, while similar studies are progressing in

several other states under prior legislative authorization.

Wyoming lawmakers approved for submission to the voters at the 1954 general election a proposed state constitutional amendment to outlaw the diversion of highway-user tax receipts to nonhighway purposes. Similar amendments, patterned after those already adopted by 24 states, were given initial legislative approval in Connecticut and Tennessee, but will require further action at the next sessions before going to the voters. Such an amendment also was passed by the Maryland legislature but was disqualified because of a technicality.

In Illinois a bill was enacted to eliminate an \$8,000,000 annual increase in truck license fees which had been scheduled to go into effect next January under a 1951 law. The new bill, however, retains a \$20,000,000-a-year increase that went into effect last year.

The new law also provides for restoring an optional weight-mileage feature knocked out in 1951. This provision, known as the T-plate, permits truckers to pay half of their flat fees and pay the remainder of their license charges on the basis of miles traveled on the highways.

In Iowa an increase in the state gasoline tax rate, from 4 to 5 cents a gallon, went into effect July 1, with the anticipated \$7,500,000 in additional annual revenue to be used on primary highways now improved only with gravel or crushed rock. The measure calls for expiration of the tax boost in two years.

In Maine the legislature enacted a \$46,500,000 general highway allocation bill, effective July 1. The total was approximately \$6,000,000 higher

than the record allocations for fiscal 1951-53.

In Montana the legislature, although rejecting proposals for a gasoline tax increase and a new ton-mile tax, enacted bills expected to produce \$1,160,000 in additional annual road funds from new levies against trucks. The new laws include a 25 per cent increase in large truck fees, tightening of the gross vehicle weight tax, an increase in logging truck fees, a requirement for registration of out-of-state truck fleets, and an increase in farm pickup truck fees.

Higher Gas Tax

In Nebraska the legislature enacted a bill increasing the state gasoline tax rate from 5 to 6 cents a gallon, to raise an estimated \$4,500,000 in additional annual revenue for highway construction. Also enacted was a bill increasing motor vehicle registration fees, to raise an estimated \$3,123,000 in additional annual revenue.

In North Dakota the legislature raised registration fees for trucks having a gross weight of six tons or more, effective next Jan. 1, with the new increases ranging from \$3 per ton for vehicles weighing six to 12 tons to \$5 per ton for those over 12 tons. Other enacted legislation included a bill authorizing the issuance of an additional \$3,000,000 in state highway revenue anticipation certificates.

Ohio's new gas tax rate of 5 cents, up one cent, will produce \$23 million additional annual revenues, and another \$20 million is expected from the new ton-mile truck tax. A \$500 million bond issue for roads goes before Ohio voters for approval in November. Bonds would be issued at \$125 million annual rate.

In South Dakota, motor vehicle registration fees were increased by the legislature, with the boost amounting to \$5 to \$10 for passenger cars and \$5 to \$110 for trucks.

In Tennessee, issuance of \$24,000,-

California Votes Important New Revenues

The California legislature has enacted a compromise highway financing program which increases the state gasoline tax and other highway-user levies to raise an estimated total of \$692,000,000 in additional revenue over a 10-year period.

Principal provisions of the program are: An increase of $1\frac{1}{2}$ cents in the gasoline tax, which went into effect July 1, with the boost slated to revert to 1 cent after two years; a $2\frac{1}{2}$ cent increase in diesel fuel taxes; and a 33 per cent increase in other highway-user taxes, except that the 3 per cent gross receipts tax for for-hire trucks will be unaffected.

Reybold Suggests Joint Congressional Committee to Study Road Problem

Thorough study of highway problems by a special joint Senate-House congressional committee was strongly recommended recently by Lieutenant General Eugene Reybold, Executive Vice President, American Road Builders' Association, in hearings before the Subcommittee on Roads in the House of Representatives.

"Appointment of a joint committee is urged to conduct a thorough investigation of the adequacy of the entire national network of highways, including the Federal-aid systems of interstate, primary, secondary, and urban highways, together with a

concurrent study of means of financing," General Reybold said. He recommended that the committee consider the feasibility of a 10-year national program devoted to the correction of highway deficiencies in the Federal-aid system. With specific reference to highway finance, the former Chief of Army Engineers, who directed a 13 billion dollar program in World War II, called for an embrasive study of taxation, tolls, Federal grants, and the utilization of Federal credit whereby highway agencies may obtain construction loans on a long-term amortization basis.

600 in highway bonds was authorized by the legislature, with \$10,000,000 of the total to go for arterial highways and \$14,000,000 for rural roads.

In Washington, a new state highway bond issuance up to \$18,000,000 was authorized by the state legislature, in addition to the \$66,700,000 in highway bonds given legislative approval two years ago.

The State Highway Commission has announced plans for the sale of \$27,000,000 worth of the bonds in the fall. State Highways Director W. A. Bugge said the money would be used with other funds available to pay for some \$35,000,000 in highway work planned during the ensuing year.

Massachusetts highway officials plan to have \$87,000,000 in new projects under way by early spring of 1954. This is added to the \$81,000,000 worth of projects under construction as of July 1, and also does not include any part of the proposed \$200,000,000 east-west toll road across the state, according to an announcement from state commissioner of public works, John A. Volpe.

Of the new work to be started, \$64 million is under the state program, and \$23 million is for seventeen projects in the Boston area under the 1948 master plan of the Metropolitan District Commission, Charles W. Greenough, commissioner.

The proposed toll road location is expected to be settled soon, the Massachusetts Toll Road Authority being at work on route studies this summer.

Among the more important state projects is a relocation of Route 2 across the northerly part of the state, bypassing Athol and Orange; and a continuation of work on Route 128, the dual outer belt around Boston.

State begins \$47,000,000 road-bridge-tunnel job

One of the major municipal traffic relief undertakings begun recently is the Hampton Roads Project, being started under the Virginia Department of Highways. The job which will include a bridge, highways and a sub-aqueous tunnel, will provide a direct vehicular route from Norfolk. Total length of the project is 21 miles, including 1.3 miles of water crossing and 2.3 miles of trestle approaches. More than 27 structures are included in the job, for which the firm of Parsons, Brinckerhoff, Hall & MacDonald has been engaged as consulting engineers for design and supervision.

Highway department to be modernized

The Kansas Highway Commission has announced a departmental reorganization, designed to provide more concise delegation of authority, and fixing of responsibility and accountability.

Under the new plan, which became effective July 1, the highway commission and director will determine policies. The director, Gale Moss, will directly supervise one group of operations consisting of the public relations department, legal department and secretary of the commission.

The state highway engineer, R. C. Keeling, will be responsible for all engineering and related matters and will have direct control and supervision of the planning department and the research board.

All other departments will be component parts of one of three sections, as follows:

Surveys, Plans and Construction,

in charge of W. S. McDaniel, assistant state highway engineer. This section will have charge of construction, design, materials, right of way, county secondary roads, and office engineer.

Operation, Maintenance and Reconstruction, in charge of R. R. Ireland, new traffic manager. Included are the departments of maintenance, purchasing, safety, traffic control and special permits.

Administrative, in charge of C. L. Murphy, now auditor. This section will have the auditing, radio communication, personnel records and vehicle department.

CIMA group pays tribute to MacDonald

The many friends of retired Commissioner of Public Roads, Thomas H. MacDonald will be interested in the following letter sent to MacDonald recently by Harold T. Reishus, President of Construction Industry Manufacturers Association:

Dear "Chief":

It is a sincere privilege for me to transmit to you the following tribute of our Industry for your excellent service to the country on behalf of our Nation's highway system:

"The Officers and Directors of the Construction Industry Manufacturers Association, on behalf of the entire industry, desires to pay its sincere tribute and appreciation to Thomas H. MacDonald for the multitude of contributions he has made to the American road program.

"For 34 years, since 1919, Mr. MacDonald's service to the country, as Chief of the Bureau of Public Roads, has been of inestimable value in guiding a sound Federal policy for the development of an adequate system.

"The development of the Nation, its communities and its resources has been largely dependent upon the constant growth and development of the Nation's highway system. In parallel with this growth, the engineers, the contractors, the officials, the distributors and the manufacturers of equipment have constantly improved design, methods and equipment but all recognize the outstanding contribution of Thomas H. MacDonald which has earned for him the title of 'Mr. Good Roads'.

"The entire industry joins in paying this sincere tribute."

Respectfully submitted,

(signed) H. T. REISHUS

• A truck-laning program is planned by the Ohio department of highways for 1953 and 1954. Ten short sections of arterial highway have been selected where heavy trucking and long hill grades have combined to create a bottleneck. Contracts are to be awarded totaling about \$1.5 million to add extra lanes over the hills and make related improvements, according to a report from the office of S. O. Linzell, highway director.

Free Competition in Highway Bidding

By Harold J. McKeever

In Illinois recently the newspapers aired an attempt to prevent out-of-state contractors from bidding on state road jobs. A "mysterious" directive came from the office of Edwin A. Rosenstone, state director of public works, which required out-of-state contractors to bring their equipment into Illinois for inspection before bidding for the first time. In further changing the prequalification requirements the directive also limited the volume of work to \$75,000 during the first year for such bidders, thus effectively creating a closed ring for Illinois contractors.

As a newspaper editorial put it, no contractor would think of crossing the state line into Illinois under these conditions unless he has holes in his head. He would have to spend thousands of dollars for transportation without any assurance of even a small amount of work.

Public Money's Worth

The latest report is that the director has backed down, under vigorous publicity by the Chicago American and other newspapers, and because the Bureau of Public Roads threatened to withhold federal highway aid to Illinois. Public Roads Commissioner Francis DuPont has a more or less mandatory duty under Bureau regulations to withhold funds where competition is limited. For a time there remained the question of what properly to do about five million dollars in road contracts that were advertised under this limitation. After a conference between state and Bureau officials, Mr. Rosenstone agreed to withdraw the questioned pre-qualification clauses. And the Bureau approved all of the May 8 contracts except two over which there had been a specific protest from an out-of-state contractor.

If Governor Stratton wants to assure Illinois people their full money's worth in road construction, he will not only revoke this order, but see that the political atmosphere surrounding

the division of highways is kept clear of such developments. Public faith in the integrity of highway building agencies is essential these days when popular support of enlarged programs is being sought to solve the highway transportation muddle.

What Illinois needs desperately right now, as do all the states, is to build up a larger staff of able engineers who will make careers in state highway work. These engineers must feel their outfit is a topflight one that's "going places" in the execution of the tremendous, complex and challenging roadbuilding program that lies ahead. Money grabbing schemes by political insiders have a devastating effect on the morale of highway department engineering personnel.

Established contractor associations in Illinois had no part in this move. Contractors have more to lose than to gain by schemes to limit competition and by the antics of political influence peddlers. With big turnpike projects in the offing and expanding road construction generally, more and more contractors who can qualify have regional rather than one-state bidding territories. Equipment is being made more transportable, as an article in this issue describes; many a contractor thinks nothing of sending his machinery five hundred or a thousand miles to get jobs.

Shoe on Other Foot

This pattern is an inevitable development in a field where individual state programs fluctuate. In fact, Illinois might need out-of-state help very badly someday if and when a real program of toll expressways and road modernization is ever undertaken in keeping with the state's needs. Or, conversely, with the truckers' road tax reduced by a recent bill signed by Governor Stratton, and the Illinois road program thus slowed, Illinois contractors might want to get in on the big road jobs coming up in other states. The shoe fits both feet.

The American free-competition way

is the only thinkable way to get on with the big roadbuilding task in this country. It would seem politically smart for a governor who inherits a competent highway department staff, as in Illinois, to give this staff a free hand and take credit for helping give the public full value through open competition and by every other kind of support.

Briefly Noted . . .

In our February issue we commented on the remarkable record of Morrison-Knudsen Co., Inc., in holding its veteran employees. Another contractor whose outstanding success is based largely on the loyalty of its long-time employees is Koss Construction Company of Des Moines. This company has 12 superintendents and other key men who have served 20 years or longer, 13 men 15 years or longer, and 8 men in the 10 year club. George W. Koss, Chairman of the Board, heads this list with 39 years of service in his own company.

Koss Construction Company was also one of the growing number of leading construction companies which publish an employee magazine. This firm's "Hard Roaders Outlook" recently announced the company's goal of 1,125,000 square yards of concrete paving to be placed during the 1953 season in the middlewestern states.

. . .

Major statistic, which will vitally affect all road work; vehicle registration which now exceeds 53 million will probably exceed 85 million by 1975. Trucks will grow from a present 9.5 million to 20 million. Estimate is from H. A. Radzikowski of the Bureau of Public Roads.

These figures, as inevitable as our National growth, remind us that time is awastin'. If our system is retrograding physically under present traffic, how can we cope with greater volumes without an accelerated pace in modernization and expansion of traffic facilities?

IT COSTS LESS TO BUILD GOOD ROADS THAN TO HAVE POOR ROADS

32-Acre Soil-Cement Parking Lot

Processing of sandy site for barge terminal required flooding ahead of the work, to secure traction. Contractor devised equipment modifications, such as use of over-size tires on motor grader, to meet conditions and complete entire job in winter months.

A 158,000 sq. yd. soil-cement paved area for barge terminal storage, first project of its kind, has been completed on President's Island, near Memphis, Tenn. Used for storage of automobiles brought in by barge from northern production centers, the terminal is owned jointly by Commercial Barge Lines, Inc., of Detroit, Mich., and United Transports, Inc., Oklahoma City, Okla. It is an outstanding example of the growth of transportation facilities serving the booming industries in the Memphis area.

The terminal is located on the newly developed harbor project constructed by the Corps of Engineers, U. S. Army, Memphis District, in cooperation with the Memphis and Shelby County Port Commission. Some 360 acres of industrial sites are now available at this location with an additional 300 acres under development.

Early Completion Desired

Soil-cement was chosen for the project for a number of reasons, chief among which was the fact that the bid of \$123,021 for the 6-in.-thick soil-cement base alternate was nearly \$7000 under the next low bid. Unit price was \$0.83 per sq. yd. including the bituminous cure and single surface treatment. An almost equally important factor however was the owners' desire for early completion of the terminal. The contract was let toward the end of November; that soil-cement could be built in this region during the rainy winter months was well known.

Work got under way January 7, when preliminary grading began. Construction was carried out entirely during winter months among frequent heavy rains and occasional freezing temperatures. The rain generally was helpful in the sandy soil present; the cold weather caused a few delays

but no damage to the soil-cement. The last bituminous curing material was placed during the first week of April. Daily productions of more than 7,500 sq. yd. were attained after job procedures were established. This high production indicates the efficient organization achieved by the contractor.

The area processed is divided into two parts—22 acres of flat land and 10 acres on a 12 per cent slope descending into adjacent Lake McKellar, which actually is an off-shoot of the Mississippi River. The slope was processed down to the normal water level; at highest water level recorded some 140 linear feet of the paved area would be under water. The site is covered with a uniform coarse sand placed during dredging operations by the Corps of Engineers in 1950. Laboratory tests indicated that 10 per cent cement by volume would convert the unstable sand into excellent soil-cement.

The uniform coarse gradation of the sand was the major handicap faced by the contractor. The dry sand afforded little traction for rubber-tired vehicles, but, like most sandy soils, was more stable when wet. A high-capacity pump supplied water



★ Cement spreader being pulled by bulldozer; grading; final rolling in progress

★ Barge load of automobiles being handled through terminal. Memphis in background

★ Preliminary grading with bulldozer. Note sandy texture of soil

from the lake to keep the sand flooded ahead of construction operations. Since drainage through the sand was extremely rapid, a great deal of water had to be available at all times.

The water was pumped to the site through 4- and 5-in. high-strength aluminum alloy tubing. Valves were installed at 20-ft. intervals and 4-in. fire hose was used for flooding. The same system supplied water for the traveling mixer.

Special Equipment Needed

So long as the sand was wet it was stable enough for most operations, but watering did not entirely solve the problem. The bulk-cement dump trucks which pulled the cement spreader immediately bogged down in the sand, wet or dry. So the contractor, demonstrating his ingenuity, acquired three army surplus half-track trucks which he fitted with dump bodies. These trucks along with the crawler tractors were the work horses on the job since the use of rubber tired equipment had to be confined almost entirely to finishing operations.

Next it was found that the sand did not offer enough traction to turn the wheels on the cement spreader. Watering the sand helped, but once again was not an adequate measure. This problem was solved by simply replacing the spreader axle with a longer axle on both ends of which were attached drums with welded cleats, much like paddle wheels. The machine functioned satisfactorily with the added traction given by these cleated drums.

The site first was leveled and brought to grade with bulldozers and a modified Caterpillar grader having large front tires and low tire pressure on all wheels. Cement was spread by the modified spreader described above. A 5-ft. P&H traveling mixer followed, adding water, mixing cement, soil and water, and depositing the mixture in an even layer, all in one operation.

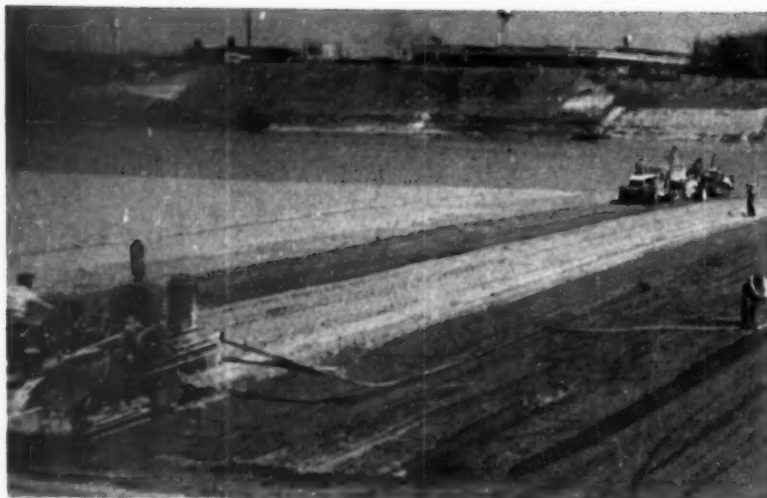
No Sheepfoot Rollers

After a Caterpillar D-6 tractor made several trips over the mixture for initial compaction the surface was further compacted and smoothed by a pneumatic tire roller. Sheepfoot rolling of course was useless in the loose sand. The motor grader then

★ Grader with over-size tires, clipping surface before final rolling

★ Construction operations. Water-spray curing in foreground

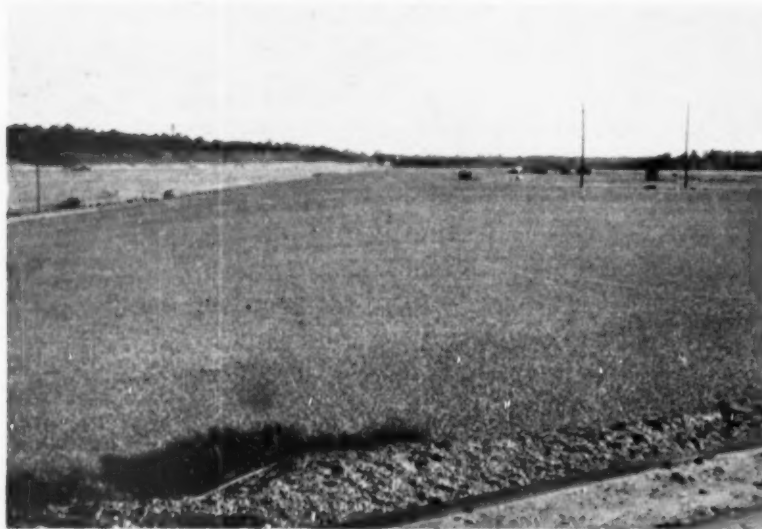




★ Stabilizer at left. Water was supplied through aluminum tubing and fire hose. Cement spreader just over hill



★ Final rolling with 13-wheel pneumatic roller. Steel roller in rear was fabricated on the job from 8-ft. section of 30-in. steel pipe, weighed 1000 lb.



★ Completed Lot No. 1, looking East. Lake McKellar on left. Bituminous surface in place

clipped the surface, a spiketooth harrow scratched out surface compaction planes, and final rolling was done with the pneumatic tire roller. Roller tires were inflated to 5 to 10 lb. pressure at all times.

A small smooth wheel roller, fabricated on the job from 30 in. steel pipe, was hitched behind the rubber tire rollers to effect a complete removal of tire marks. The smooth tires on the farm tractor used in finishing operations left no tread marks which were not ironed out by the rollers it pulled. The contractor's precautions with the exceedingly "tender" surface were rewarded by the excellent finish attained.

Because the soil hardened rather slowly it was necessary to water cure the soil-cement for about 48 hours before the asphalt distributor could be used without marring the surface. Rotating nozzle sprays and fire hoses kept the completed surface wet for the required time.

A curing coat of 0.18 gal. per sq. yd. of asphalt emulsion was sprayed on the compacted surface after water-spray curing. Field-density tests and depth checks were run on each completed section to keep close control on the process. Barrow-Agee Laboratories, Inc., of Memphis, represented by J. F. Norman, handled testing on the job.

Problems on Grade

Processing the steep slope presented problems somewhat different from those encountered on the level. Traction in the sand was so poor that all cement hauling and spreading equipment had to be pulled by crawler tractors to move up the slope. The cement spreader did best when worked up the slope, while the traveling mixer had to be worked downhill. Drainage through the sand was slower on the slope, making it somewhat easier to keep the soil moist during processing.

Architects and planning consultants were Robert E. Brown and Robert Day Smith of Memphis. Associated Engineers, represented by O. S. Rodgers and L. S. Stephens, performed the engineering. Bowyer and Johnson, paving contractors, were represented by paving superintendent David Smith and foreman Charles Ezzell.

Equipment on the job included a Barber-Greene cement unloader, a Caterpillar motor grader, Caterpillar D-8, D-6, and D-4 tractors, a 5-ft. P&H single-pass stabilizer, a Smith cement spreader, and Farmall and Ford farm tractors.

Traffic deaths increasing

Highway and street traffic deaths rose to 14,230 during the first five months of 1953—4 per cent more than for the corresponding period of 1952, according to the National Safety Council.

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How to Grub Trees Near Houses



★ Branches that might hit an adjacent house during the fall were yanked away with a clamshell bucket



★ Brush thus loosened was raked into piles with a pull-shovel which was on hand for general project work



★ Most of the trees were pushed over with a dozer after first cutting roots with the blade corner



★ Felled trees were cut up with a chain saw, logs and stump loaded into trucks for removal

HOW would you go about taking out 600 husky shade trees in the midst of homes and store buildings?

This was a problem faced by the crew of Visintine & Co., general contractors of Columbus, Ohio, as part of a grade separation and street reconstruction program at Fostoria, Ohio.

After brief experimentation the contractor's men first stripped the branches, so that the trees when felled would not damage adjacent houses. A 1½-yd. crane with clamshell was used with an expert operator able to reach branches, close the bucket teeth on them, and yank them loose. Brush was piled with dozer and pull shovel. Then a dozer operator working "western style," cut shallow roots with his blade corner and walked the trees over, taking old trees up to 36 in. diameter without necessity of sawing until the trees were down.

● The ratio of maintenance to construction expenditures on the Nation's highways has risen from 0.4 in the late 30's to 0.6 in 1950 and is still rising, according to a report by H. A. Radzikowski of the U. S. Bureau of Public Roads.

● Chicago's expressway financing problem will be studied by a citizens advisory group, appointed by William N. Erickson, president of the Cook County Board of Commissioners.



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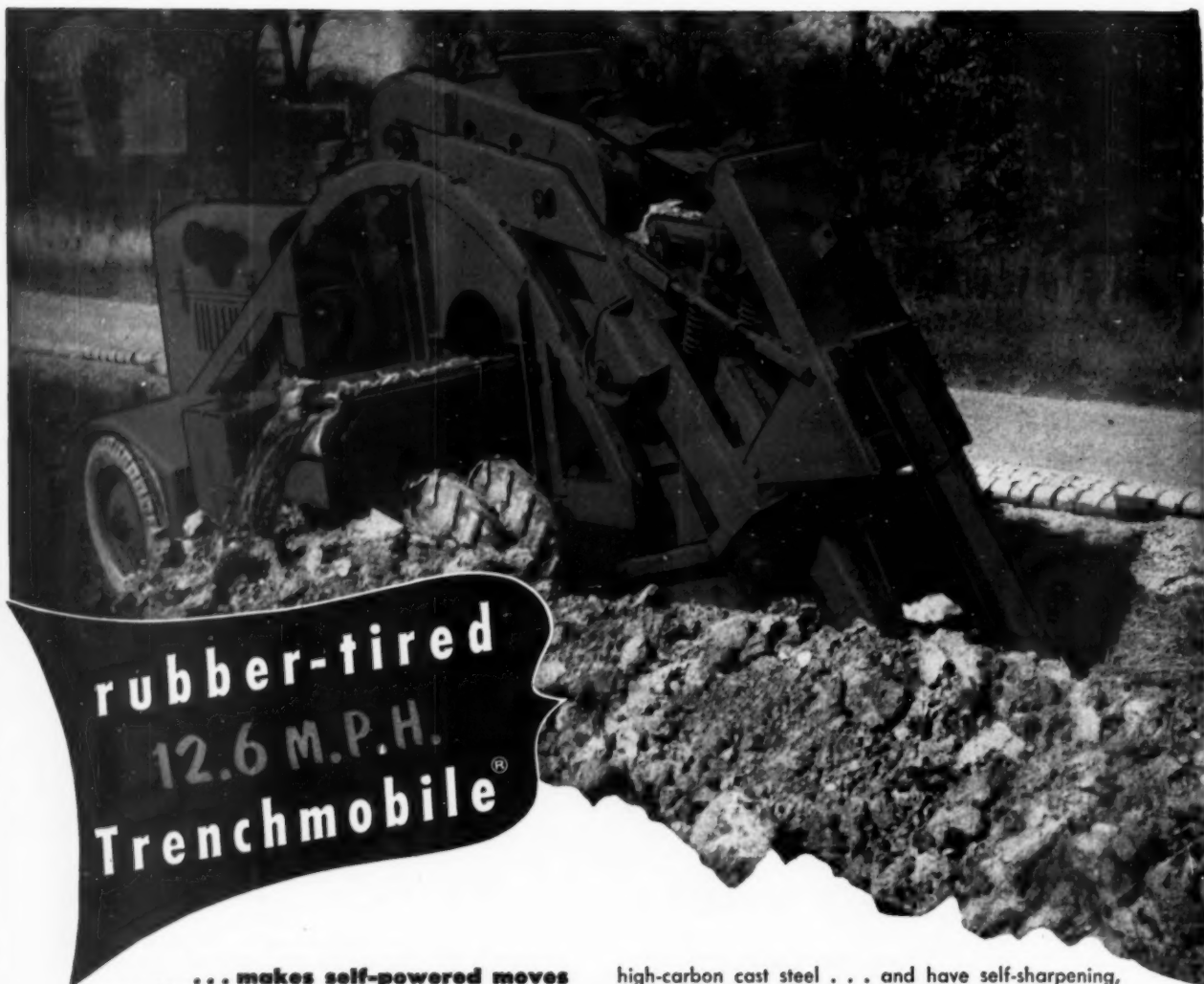
MORE RUGGEDLY BUILT! New Chevrolet trucks are stronger and sturdier than ever before. Frames, for example, are heavier and more rigid. This extra, built-in stamina means miles added to truck life and dollars *subtracted* from upkeep costs! Another important "plus" you get with Chevrolet trucks!

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Parsons rubber-tired 88 Trenchmobile drives anywhere at road speeds up to 12.6 m.p.h. . . no waiting for trailer, loading or unloading delays. It maintains fast "work-and-run" schedules . . . a job 6 miles away can be started in less than 30 minutes from "now".

Digs up to 20 ft. per minute . . . 8 or 12 in. wide, in depths to 5 feet . . . gives you low-cost, one-man trenching on gas and water mains, off-street service connections, pipe reclamation, underground cables, lighting and sprinkling systems, foundation footings, etc.

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high-carbon cast steel . . . and have self-sharpening, easy-in, easy-out "Tap-In" teeth that maintain maximum digging efficiency under all soil and job conditions.

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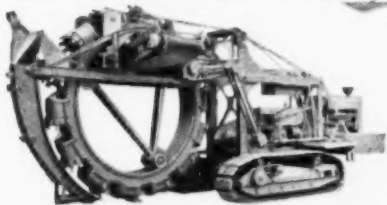
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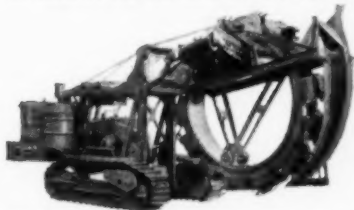
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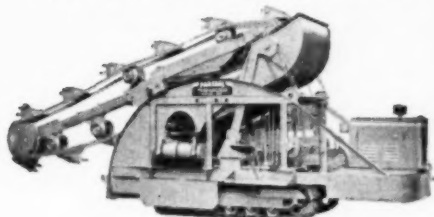
Check work capacity of these 5 Parsons TRENCHLINERS . . .



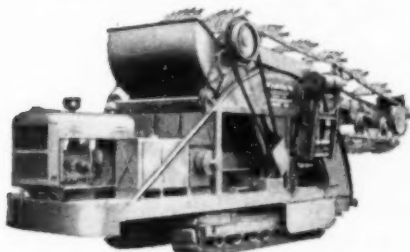
WHEEL-TYPE 202 digs 13 to 31 in. wide, 6 ft. deep; 30 digging feeds up to 18½ F.P.M.



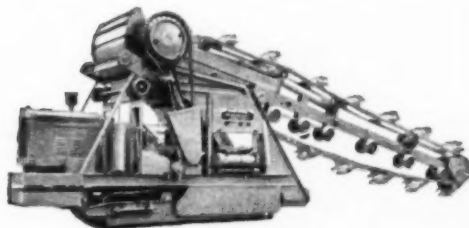
CROSS-COUNTRY 215 WHEEL-TYPE digs 13 to 31 in. wide, 6 ft. deep, up to 18½ F.P.M.



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LOAD 1500 LBS. in Kwik-Mix Moto-Bug®

This low-cost power wheelbarrow, with 10 cu. ft. (struck) hopper, has a 1500-lb. load-carrying capacity . . . climbs 20% ramps fully loaded with operator riding on rear step. Hopper has instant gravity dump with snub-line control. There's full power forward and reverse . . . no push, no pull necessary. 3.6-to-1 gear ratio on large steering wheel gives effortless maneuvering. Interchangeable units: flat bed, 5-foot fork lift, scraper.

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FLECO ROCK RAKE PILES CONCRETE SLABS WITH EASE



Caterpillar D7 Tractor equipped with Fleco Rock Rake rips up concrete slabs on highway construction job near Jacksonville, Florida. Owner is Duval Engineering & Contracting Co. of Jacksonville.

As a part of the construction of a super highway system in the Jacksonville area, it was necessary to rip up an eight inch thick four lane concrete road. The flow of traffic was to be interrupted as little as possible and because the new pavement was to be laid down on the same right-of-way, it was desirable to minimize the disturbance of the roadbed and movement of dirt.

Following a skullcracker which was dropped at four to six foot intervals, the ruggedly constructed Fleco Rock Rake mounted on a Caterpillar D7 Tractor ripped up and piled these concrete slabs weighing up to three tons apiece, in dirt free windrows on one side of the road at the rate of 100 feet an hour. The manganese alloy cast steel teeth, mounted on the heavy duty frame, allowed the dirt to sift through leaving a smooth, level, slab free surface. The roadbed was ready for traffic and remained in use until work was started on the new surfacing two weeks later.

An additional advantage of the Fleco Rock Rake

is in the special curve of the teeth which gives it suction and makes it possible to get in under and lift up the heavy slab without the necessity of a deep dirt moving penetration to get started.

Disposing of the windrows was faster and easier too because the loaders weren't loading dirt with the slab, so each truck load hauled away was all pay load.

Your Fleco "Caterpillar" dealer will be glad to show you many other uses for the versatile Fleco Rock Rake. Give him a call.

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COMPARE *these* FEATURES
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When you need a 1-yd. class machine, we ask only this — see the *Lorain-50 in action* before you buy!

Compare a Lorain-50 shovel *in action* with any other make. Compare design features and what they do for you, and you'll see why your investment in a Lorain will pay off.

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output. See how *Center Drive* turntable construction transmits power in the most direct line to cables and dipper teeth. See how easy it is to change to any one of *5 front ends* to enable you to bid most any contract.

These, plus many other features, make up the famous Lorain "*balanced quality*" throughout the machine. For best proof of Lorain-50 features, see one *in action*!

Your near-by Thew-Lorain Distributor wants to show you a Lorain-50 in action — point out to you the many advantages that will be yours when you bid your future jobs on the basis of Lorain-50 performance. He is close to you. Call him now!

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ALLIS-CHALMERS MOTOR SCRAPERS

FULL CONTROL makes

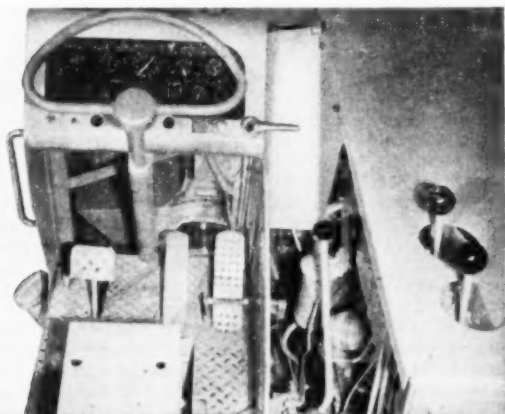


TS-300 IN ACTION

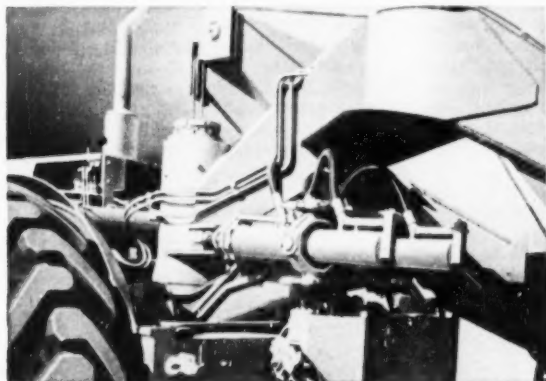
14 cu. yd. struck capacity
18 cu. yd. heaped capacity
280 hp. Buda diesel or
275 hp. Cummins diesel

the difference

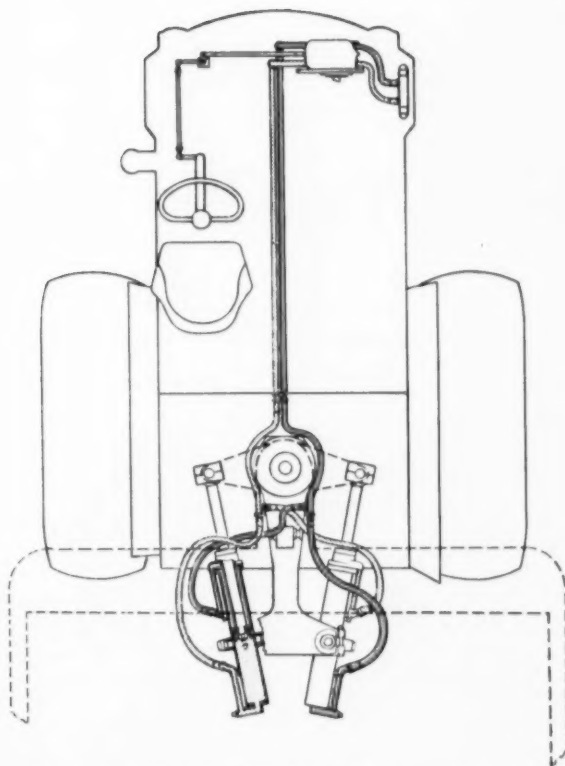
The full control built into Allis-Chalmers *Motor Scrapers* offers you a real advantage. There's no tiring wheel fight for the operator . . . no straining to see what he's doing. What's more, full control creates greater confidence when he's high-balling a full load. He can work at his best all day long easily and safely. To you owners, that means moving *more dirt faster, more profitably.*



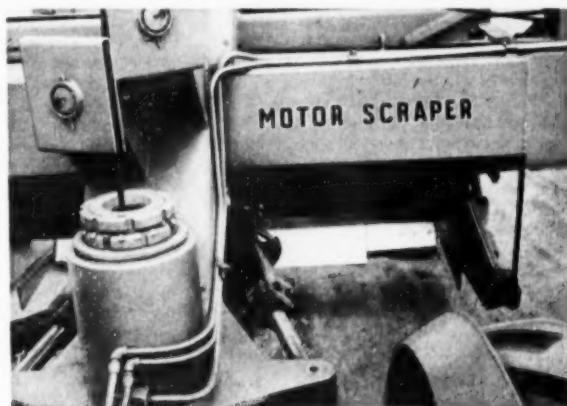
One Hand Does the Steering—the other handles the scraper controls. Fast action makes loading easy. The operator can utilize hydraulic power of steering jacks to pull through soft spots in haulways under extreme conditions.



No Weaving—No Road Shock — Hydraulic system is locked and the *Motor Scraper* becomes a rigid 4-wheel unit except when steering wheel is turned, thus eliminating transmission of road shock to steering wheel. Low-mounted rams, close to load line pull, mean minimum stress on the kingpin.



Easy, Fast-Action Steering — Schematic layout shows simple double-action steering system. Slightest movement of wheel opens valve of gear-type pump; release wheel and valve automatically returns to "hold." Only a one-third turn of steering wheel is necessary for a full swing of the tractor.



Excellent Operator Visibility — Clean design of low gooseneck connection gives operator unequalled view of cutting edge, helps him cut cleanly, efficiently . . . load fast and full.

Your nearby Allis-Chalmers dealer will be glad to show you and give you the full story on these job-proved *Motor Scrapers*. See them at work.

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WHAT'S BEING DONE TO

Make Your Big Rigs More Transportable

Paper presented before the Earthmoving Industry Conference of the Society of Automotive Engineers, Peoria, Illinois, April 9, 1953. Reproduced herewith by permission of the Society.

By H. W. Rockwell

Chief Engineer
Allis-Chalmers Manufacturing Co.
Cedar Rapids Works
Cedar Rapids, Iowa

IN view of the fact that the earthmoving industry is so dedicated to benefiting mankind through providing more convenient and economical transportation facilities, it would seem unnecessary that severe limitations be imposed on contractors in connection with the movement of equipment from one job to another over the nation's highways.

This does not imply that we should arbitrarily demand unlimited access to transportation facilities without regard to safety and proper rights of others or at the risk of permanent and unwarranted damage to road surfaces. However, it would seem that we are justified in suggesting relief from certain legislative restrictions, which are primarily intended to govern commercial carriers in their every-day use of the highway system. Most states are quite liberal in granting special permits for movement of equipment which is over limit dimensionally but with limitations as to the day of the week and hour of the day in the interests of safety. Some states, in recognition of the vital importance of their road construction programs, do issue these special per-

mits for transporting earthmoving and construction equipment on which the axle loading is over limit.

Railway Limitations

Before embarking too far into a discussion concerning the movement of equipment over the highways, it may be well to consider other transportation problems which have influenced the design and should concern the designer of earthmoving equipment. Insofar as rail shipment is concerned, there would appear to be little of a restrictive nature imposed on the designer. Most every engineer recognizes the 11 ft. 6 in. width limit without question. This limitation is presumed to result from dimensional limitations of tunnels, bridges and other truck clearance.

Actually, rail shipment poses problems to a traffic manager about which the designer seldom hears. Any width beyond that of a standard flat car may mean that the shipment must go by some route other than the most direct. As the width, or height also for that matter, becomes greater more difficulty is encountered in finding a route over which the equipment can reach its destination. Most main line track clearance will accommodate 11 ft. 6 in. width, and wider equipment can be shipped over carefully selected sections of the rail systems.

It is difficult to imagine just how big earthmoving equipment would become if it were not for rail width limitations. It is not uncommon to partially disassemble units such as large shovels and draglines for delivery to more or less permanent operations. Shipping crawler tractors with equipment unmounted is quite

common, particularly dozer blades, even for medium sized tractors. Removing attachments of this kind is relatively simple and the designer need only provide adequate attaching means which are readily operable. If crawler tractors were to be designed in the proportion of recently constructed twin-units, transportation would become a problem even without attachments.

Export Shipping Problems

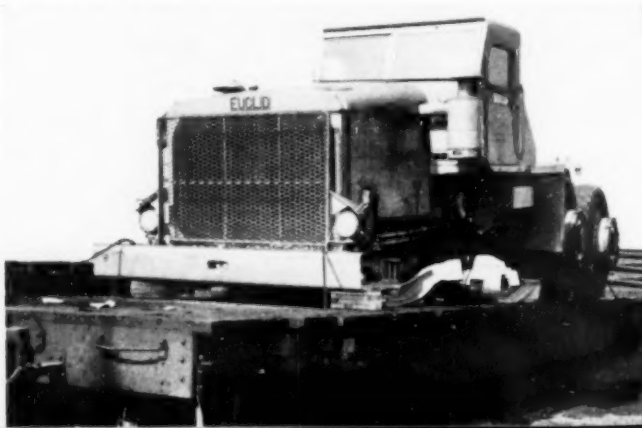
The export sale of earthmoving equipment, if of considerable volume, must be given consideration by the designer. Water transportation costs are established on the basis of cubage, which makes it desirable for the manufacturer to ship his product in the smallest possible package. If the export sale of a unit was given no consideration at the time of design, modifications such as bolting rather than welding on certain space-taking projections could be done. Even though a projection may be only one inch beyond an otherwise defining surface, it means that the cubage is figured as a box having one side moved outward by that amount. If this happened to be a side of a considerable area, the transportation costs could increase appreciably or, conversely, elimination of projections could result in noticeable savings. Even though the customer usually foots the bill, an alert salesman will make considerable conversation out of it from a competitive standpoint.

Foreign rail systems with a considerable amount of narrow gage tracks are certainly a problem. This is usually solved by selling the small-size units or by disassembly of larger units. There have been cases where

★ Figure 1—Example of very large earthmoving unit, Euclid Model 1 LLD 50-ton rear-dump



★ Figure 2—Showing how the Euclid 50-ton unit can be made transportable without excessive disassembly

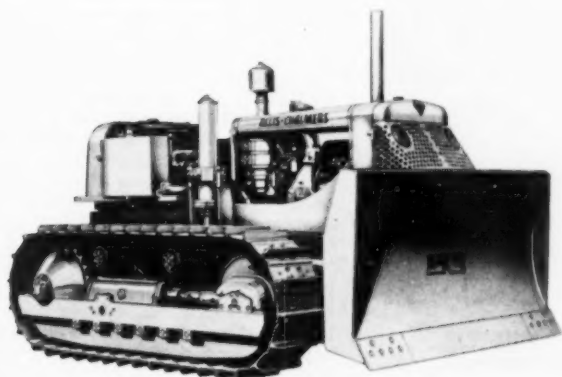




★ Figure 3—Bucyrus-Erie knock-down type dozer, designed to come within width limitations



★ Figure 5—An example of irregular-shaped unit easily made transportable—D7 Caterpillar tractor with Hystaway dragline and dozer



★ Figure 6—Baker 9X dozer—blade width kept to 96 in. over-all by careful design.



★ Figure 7—Digging slush pit with a "narrow dozer", designed for wide usefulness as well as good transportability

large weldments have been cut by torch for shipment, then rewelded and reassembled at the destination. Similar procedures have also been followed for shipment by air to extremely remote points of operation. These cases are rare; with but a few exceptions, they may be ignored by the designer.

In connection with rail transportation and its effect on the size of equipment, Fig. 1 showing the Euclid model 1 LLD 50-ton rear dump unit is a good representation of a giant in one family of earthmoving equipment. Contrary to a first impression, such a unit can be made transportable without an abnormal amount of disassembly as indicated in Fig. 2. The box is removed and positioned on its side in a gondola car along with the front wheel units and the outer wheel assemblies of the tandem axle duals. Quite naturally the average contractor would not be interested in a piece of equipment which would require even this much disassembly, particularly if frequent moves were necessary from one job to another.

Fig. 3 shows a Bucyrus-Erie knock-down type dozer mounted on an International Harvester TD-24 tractor. This type of bulldozer can be removed

from the tractor, disassembled by removing 6 or 8 pins resulting in components convenient for either rail or truck transportation.

Highway Transport

Transportability over the highways is of primary concern to both the manufacturer and the user of earthmoving equipment, and it should be clearly stated that it is not intended for this paper to argue the pros and cons of the rather controversial 18,000-lb. axle load limit. Let us assume this limit is justified on the basis of the construction and condition of our present highways, and that its primary purpose is to control axle loads on commercial carriers engaged in routine transportation. Let us again assume for a few moments at least that earthmoving equipment must conform to the 18,000-lb. axle load limit, and that special permits can be obtained for moving dimensionally over-limit equipment.

Fig. 4 is a chart of "State Size and Weight Restrictions" compiled by the Truck-Trailer Manufacturers Association, Inc., showing that 34 of the 48 states in one way or another call for the 18,000-lb. maximum axle load. Some of these further limit tandem

axles to 32,000 lb. total or 16,000 lb. per axle. The following explanatory remarks are taken from the reverse side of the chart dated Sept. 1, 1952:

"Width limitations are not shown since, for all practical purposes, an 8 ft. limit is standard—exceptions are Arizona, Connecticut, Rhode Island, and, under special circumstances, Colorado, Massachusetts, Michigan, New Mexico, New York, Wisconsin and the District of Columbia.

"In many states maximum gross weight depends on a formula or a table in which the controlling factor is the wheel base either of the individual vehicle or the over-all length from the center of the first axle to the center of the last axle, in the combination. In preparing a general chart based on tables or formulas, certain assumptions must be made. In this case, it has been assumed that the overhang front and rear totals 6 ft., i.e., approximately 3 ft. from the front bumper to the center line of the front axle and 3 ft. from the center of the rear axle to the rear of the body or body bumper. Many trucks and trailers have more overhang than this, especially in the rear. Tandem axle trailers used with two axle tractors have considerable



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overhang. Five axle tractor, semi-trailers may readily come within the 6 ft. overhang allowance.

"The laws of most states do not differentiate between front and rear axles in limiting maximum axle loads. It is, however, impractical to load the front axle beyond a certain point which, in the formula calculations for this chart, has been assumed to be 9,000 lb. For example, if the law allows 18,000-lb. per axle, the practical gross load on a two axle truck-tractor and single axle semitrailer would be 9,000 lb. front axle, 18,000 lb. rear tractor axle and 18,000 lb. on the trailer axle, or a total of 45,000 lb.

"In figuring the maximum gross for tandem axle trailers (3rd column from right), the calculations are based on three axle tractors and tandem axle trailers wherever the greater total allowed by this arrangement of axle would be within the maximum gross allowable load. In calculating the total gross for tandem axle trailers, it has been assumed that the practical maximum length of a tractor semitrailer is 50 ft. Thus, if the formula is $750 (L \text{ plus } 40) \text{ equals } W$, where L is the distance between the first and last axle, the value of L would be 44 ft. (i.e., 50 ft. less 6 ft. overhang) and the computation would be $750 \times 84 = 63,000$.

"The 2nd column from right shows the maximum gross load permitted on any full legal combination."

Manufacturers' Effort

In order to comply with these regulations, manufacturers and users alike have made sincere and determined efforts, such as shown in Fig. 5 which is a Caterpillar D-7 tractor equipped with a Hystaway dragline and dozer loaded on a three-axle truck-tractor and a tandem axle trailer. This is a good example of a relatively irregular shaped piece of equipment being made transportable with but little disassembly. It is presumed that a special permit would be necessary due to over limit width and length dimensions. Note the bucket is positioned on the trailer gooseneck in such a way as to provide a support for the dragline boom and the dozer blade is angled in order to reduce overall width.

Width also has been given consideration in the design of the Baker 9X dozer for the Allis-Chalmers HD-9 tractor in Fig. 6. By attaching the blade to the tractor engine frame, the blade length has been reduced to 96 in., thereby making it possible to transport the unit on a low-boy without obtaining special permits. Fig. 7 illustrates another function of the "narrow dozer" as used in digging slush pits. The nature of this operation is extremely well suited for such a blade, not only in providing a fast, efficient earthmover but also one that can be readily transported to the wide-spread pit digging locations.

Fig. 8 exemplifies designing from

the ground up within the confines of highway transportation limitations. This is a Cedarapids Twin Jaw Primary crusher plant produced by Iowa Manufacturing Company in the form of a semi-trailer unit. The delivery conveyor at the extreme right of the picture has been folded for further compactness of design. Fig. 9 shows the crusher in operation with a dolly in place at the fifth-wheel connection making the unit capable of being moved on the job for positioning within reach of the dipper. In the process of providing transportability, other advantages have thereby been realized.

Fig. 10 is of a somewhat larger unit based on the same idea of transportability within established limitations. Here again width is held to 96 in. but with the delivery conveyor removed. Even though these units may not be considered earthmoving equipment, they are very closely related and certainly demonstrate a transportability achievement worthy of close study.

The Euclid Loader in Fig. 11 is mounted on a two-section dolly with the rear section attached to the frame of the loader just back of the normal load carrying tracks. The front section is coupled to the universal hitch normally attached to a draft frame. It would appear that substantial disassembly of miscellaneous component parts was necessary in making this unit transportable. In view of its relatively bulky functional design, this solution to the problem appears very logical. The axle loads are above the limits of many states, thereby prohibiting the use of this device, and it would seem that if necessary, a tandem unit could be affixed to the rear and a fifth wheel connection attached in place of the universal hitch for mounting on a three axle truck-tractor. The unit would then become semi-trailed which would be more practical for highway transportation but possibly not as convenient otherwise.

Roll on Own Tires

There is a great variety of self-propelled rubber-tired equipment most of which are capable of speeds suitable for highway transportation under their own power. Some of this equipment, such as the Link-Belt-Speeder truck crane model HC-51, Fig. 12, is designed with particular attention having been given to highway limits. The boom is folded and swung to a forward travelling position as shown in Fig. 13. In addition to the folding boom, there are telescoping outriggers as further evidence of designing for transportability. Of course, this basic unit may be equipped with attachments such as a dragline, shovel, clam shell or hoe. The larger units quite often may be moved under special permits after removal of outriggers and certain attachments. Track mounted equip-



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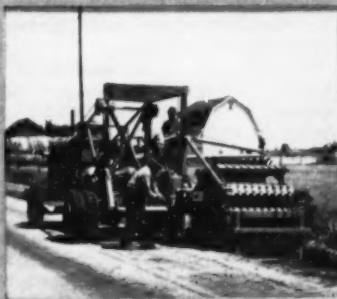
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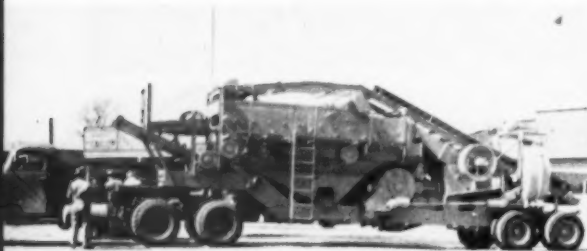
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★ Figure 8—Designed from the ground up to meet transportation limitations; Cedarapids twin jaw primary crusher plant



★ Figure 9—The same crusher (Fig. 8) seen in operation with a dolly in place of the fifth wheel connection, for easier transport



★ Figure 10—A somewhat larger crusher unit held to 96 in. width and otherwise designed with transportability in mind



★ Figure 11—Euclid loader mounted on 2-section dolly, part of scheme for transportation—see article

ment of this general type is usually loaded on low-boys.

The equipment which is currently a source of considerable controversy between users, manufacturers and public road officials, is the off-the-road rubber-tired self-propelled unit such as the Euclid tractor-scraper combination in Fig. 14. The drive axle is over the 18,000-lb. limit by approximately 3,400 lb., making it illegal in most states. Euclid has designed a dolly which clamps onto the cross member just ahead and over the cutting edge. This rubber-tired dolly carries about 6 tons and makes possible almost equal weight distribution of 13,000 lb. between the front and rear tractor, dolly and trailer axles. It is presumed that the scraper list control is placed in a float position to allow proper flexibility over irregular road surfaces. Special permits still are necessary due to width as is the case with all units of this type and size.

A somewhat greater axle load is encountered in the single axle tractor with trailer combination of the type shown in Fig. 15. This is the Allis-Chalmers TS-300 motor scraper in which the tractor axle load is approximately 31,200 lb. and the trailer axle 15,500 lb. Fig. 16 shows this model being transported by a method developed by the user, Concrete Materials and Construction Company,

with the tractor part of the unit mounted directly on a three axle truck-trailer. This user operates two of these machines in stripping overburden at three or four widely separated rock quarries in Iowa with frequent moves from one location to another. Fig. 17 shows a step in making the unit transportable. By this effective procedure a bulldozer digs a trench for positioning the truck-tractor rear wheels to allow clearance with the tractor drive wheel in the early stages of the loading operation. The motor scraper is then driven up in proper alignment with the fifth wheel until contact is made on the sloping surface of the belly-guard. A bulldozer tractor then pushes the unit forward and up the inclined fifth wheel until the tractor drive wheels are clear of the ground. The tire and wheel assemblies are then removed and the machine again pushed forward until a specially provided kingpin on the bellyguard engages and is secured by the fifth-wheel latch mechanism.

A rear dolly with leaf springs is then wheeled into place and attached to previously fixed ears on the bottom of the scraper pusher plate supporting structure. This is done with the cutting edge on the ground so that when the scraper is raised to transporting position, weight is placed on this dolly or auxiliary axle. Nor-

mally the scraper axle loading is within highway limits; however, due to the necessity of providing tractor bumper clearance with the truck-tractor cab, the fifth wheel kingpin is located somewhat ahead of the tractor drive axle causing a weight shift to the scraper axle making it approximately 1,500 lb. over the limit, thereby requiring the auxiliary axle.

This procedure is representative of the ingenuity displayed by users of earthmoving equipment when confronted with problems of this nature. "Necessity is the mother of invention," is certainly a true statement, as has been proven in many cases of this kind.

Moving Long Units

Another method which has proven successful insofar as axle loading is concerned is that shown in Fig. 18. This is a Caterpillar model DW-21 single axle tractor with scraper in which the unit is transported intact, with the tractor placed on a tandem axle low-boy coupled to a three axle truck-tractor and in which the scraper is trailed behind. The entire rig is 66 ft. overall length and is somewhat difficult to negotiate sharp turns as well as being difficult to maneuver in reverse. The accident hazard is evident in any unconventional or unnatural method of trans-

STATE SIZE AND WEIGHT RESTRICTIONS

September 1, 1952

STATE	HEIGHT	LENGTH			Maximum Axle Load in Pounds	Tandem Axles 4' Apart	Maximum* Gross Weight in Pounds			FORMULAS** and TABLES
		Single Unit	Tractor Semitrailer	Combination			Tractor Semitrailer		Combinations	
							Single Axle	Tandem		
Alabama	12' 6" A-B	35	45	N. P.	18,000 S	36,000	45,000	55,300	N. P.	700 (L + 40)
Arizona	13' 6"	40	65	65	18,000	32,000	45,000	68,000***	76,800	Table
Arkansas	12' 6"	35	45	45	18,000	32,000	45,000	55,980	64,650	Table
California	13' 6"	35	60 T	60	18,000	32,000	45,000	68,000***	76,800	Table
Colorado	12' 6"	35	60	60	18,000	36,000	45,000	67,200	75,200	800 (L + 40)
Connecticut	12' 6"	45	45	N. P.	22,400	36,000	50,000	50,000	N. P.	—
Delaware	12' 6"	35	50	60	20,000 S-1	36,000	49,000	60,000	60,000	Table
Dist. of Col.	12' 6"	35	50	50	22,000	38,000	53,000	65,400	65,400	Table
Florida	12' 6" A	40 V	50	50	18,000 S-2	36,000	45,000	64,650***	64,650	Table
Georgia	13' 6"	35	45	45	18,000	36,000	45,000	55,300	55,300	700 (L + 40)
Idaho	14'	35	60	65	18,000 S-3K	32,000 K	45,000 K	67,500***K	72,000 K	Table
Illinois	13' 6"	42	45	45	18,000 S-3	32,000	45,000	59,000	72,000	—
Indiana	12' 6" A	36 B-1	50	50	18,000 S-3	32,000	45,000	72,000***	72,000	—
Iowa	12' 6" A	35 B	45 T	N. P.	18,000	32,000	45,000	60,800***	60,800	Table
Kansas	12' 6" A	35 B	50	50	18,000	32,000	45,000	63,890***	63,890	Table
Kentucky	12' 6"	35	45	N. P.	18,000 S	36,000	42,000	42,000	N. P.	—
Louisiana	12' 6" A	35 B	50	60	18,000	32,000	36,000 P	64,000 P***	68,000 P	—
Maine	12' 6" H	45 H	45 H	45 H	22,000 S	32,000	50,000	50,000	50,000	Table
Maryland	12' 6" A	55	55	55	22,400	40,000 I	53,800	65,000	65,000	850 (L + 40)
Massachusetts	N. S.	35	45	N. P.	22,400 S-3	36,000	50,000	50,000	N. P.	—
Michigan	12' 6" A	35	50	50	18,000 S-1	26,000 J	45,000	67,000 D***	111,000 D	—
Minnesota	12' 6"	40	45	45	18,000	28,000	45,000	65,000***	66,500	Table
Mississippi	12' 6" A	35 B	45	45	18,000 S-4	28,650	45,000	52,650	52,650	Table
Missouri	12' 6"	35	45	45	18,000 S	32,000	45,000	60,010	60,010	Table
Montana	13' 6"	35 B-1	60	60	18,000	32,000	45,000	63,890***	73,280	Table
Nebraska	12' 6" A	35	50	50	18,000	32,000	45,000	64,650***	64,650	Table
Nevada	N. S.	N. R.	N. R.	N. R.	18,000	32,000	45,000	68,000***	76,800	Table
New Hampshire	13' 6"	35	45	45	22,000	40,000	50,000	50,000	50,000	—
New Jersey	13' 6"	35	45	50	22,400	32,000	53,800	60,000	60,000	—
New Mexico	12' 6"	40	65	65	18,000 S	32,000	45,000	63,000***	74,250	Table
New York	13'	35	50	50	22,400 S-3	36,000	53,800	63,000	63,000	30,000 + (Lx750)
North Carolina	12' 6"	35	48	48	18,000 S	36,000	46,200 M	58,800 M	58,800 M	—
North Dakota	12' 6" B	35	45	45	18,000 S-2	30,000	45,000	59,250	59,250	750 (L + 40)
Ohio	12' 6" A	35	45 T	60	19,000 S-5	31,500 W	47,000	69,000 W***	78,000 W	38,000 + (Lx800)
Oklahoma	12' 6" A-1	35 B-2	50	50	18,000 S-5	32,000	45,000	60,000***	60,000	Table
Oregon	12' 6"	35	50 T	50 C	18,000 S	32,000	45,000	73,000***L	76,000	Table
Pennsylvania	12' 6" A	35	45	50	20,000	36,000	45,000	45,000	62,000	—
Rhode Island	12' 6" A	40	50	50	22,400 S-3	32,000	50,000	50,000	88,000 E	—
South Carolina	12' 6"	40 V-1	50	50	22,000 G	35,200 G	53,000	70,279 G***	70,279 G	Table
South Dakota	13'	35 B	50	50	18,000 S	32,000	45,000	64,650***	64,650	Table
Tennessee	12' 6"	35	45	45	18,000	36,000	42,000	42,000	42,000	700 (L + 40)
Texas	13' 6"	35	45	45	18,000 S-5	32,000 W	45,000	58,420	58,420	Table
Utah	14'	45	60 T-1	60 T-1	18,000	33,000	45,000	71,400***	79,900	Table
Vermont	12' 6"	50	50	50	N. S. S	N. S. S	50,000	50,000	50,000	—
Virginia	12' 6" A	35 B	45	45 F	18,000 D-1	36,000 D-1	40,000 D-1	50,000 D-1	50,000 D-1	—
Washington	12' 6" A-2	35	60 T-2	60 T-2	18,000 S-6	32,000	45,000	65,000***	72,000	Table
West Virginia	12' 6" A	35	45	45	18,000	32,000	45,000	60,800***	73,280	Table
Wisconsin	12' 6" A	35	45	45	19,500 S-3X	32,000 X	48,000 X	67,000*** X	68,000 X	Table
Wyoming	12' 6"	40	60	60	18,000	32,000	45,000	68,000	73,950	Table

FOOTNOTES:

- * — Maximum Practical Gross (see third paragraph General Remarks).
- ** — Computation based on 6' over hang.
- *** — 3-axle tractor with tandem axle semitrailer.
- A — Auto transporters allowed 13 1/2'; A-1: 13'; A-2: 12'10" allowed on 10.22 tires.
- B — Buses with 3 axles permitted 40'.
- B-1 — Buses permitted 40'; B-2: 45'.
- C — State Highway Department may permit 60'.
- D — On designated highways.
- D-1 — 16,000 lb. axle limit and 35,000 lb. maximum gross limit on all but "Heavy Duty Highways."
- E — 3-axle truck with 3-axle trailer.
- F — Exclusive of coupling.
- G — Gross weight includes 10% tolerance.
- H — Height and length subject to 1'6" tolerance.
- I — 36,000 lb. if axles spaced less than 48' apart.

- J — On designated highways one tandem per combination permitted 32,000 lb.
- K — Plus 3% tolerance on axle weight and 8% tolerance on gross weight.
- L — Permit required for gross weight over 60,000 lbs.
- M — Includes 5% overload tolerance; trucks over 40,000 lb. must have 300 cu. in. motors.
- N. P. — Not Permitted.
- N. R. — No Restriction.
- N. S. — Not Specified.
- P — Plus weight on front axle.
- R — 36,000 lb. if axles do not have common point of suspension.
- S — Subject to 600 lb. per inch tire requirements: S-1: 700 lb.; S-2: 550 lb.; S-3: 800 lb.; S-4 on tires 7.75 and larger; S-5: 650 lb.; S-6: 600 lb.
- T — Trailer limited to 35'; T-1: 45'; T-2: 40'.
- V — Vehicles over 35' must have 3 axles.
- W — With tandem axles spaced more than 4' apart.
- X — Includes 1,500 lb. tolerance single axle; tandem, 2000 lb.
- Y — With permit.

★ Figure 4—State restrictions compiled by the Truck-Trailer Manufacturers Association, Inc.



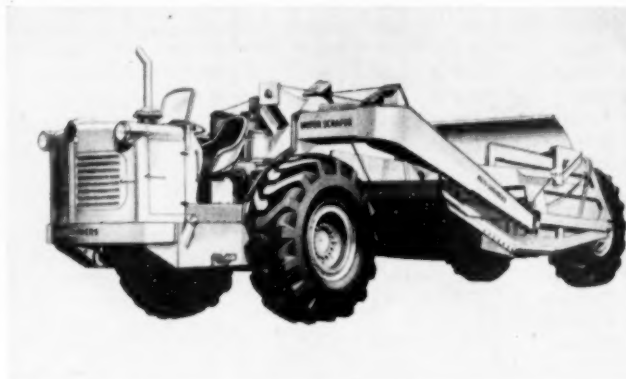
★ Figure 12—Also designed for over-the-road movement—Link-Belt Speeder model HC-51 truck crane



★ Figure 13—Same crane, boom folded and swung to forward traveling position



★ Figure 14—Self-propelled tractor-scraper combination—example of extra long units subject to controversy among highway officials



★ Figure 15—Single-axle tractor-trailer combination, TS-300 Allis-Chalmers motor scraper, example of type of unit with relatively heavy axle load



★ Figure 16—Same unit, as one user has handled transport, tractor part mounted directly on a 3-axle truck-tractor



★ Figure 17—Step in making Figure 16 unit transportable



★ Figure 18—Another method of relieving heavy axle loading; a DW 21 Caterpillar unit



★ Figure 19—Also a DW21, with complete unit carried on a tandem-axle low-boy and 3-axle truck-tractor

porting this type of unit and is particularly true of this arrangement.

Fig. 19 is also a Caterpillar DW-21 unit in which the complete machine is carried on a tandem axle low-boy and a three axle truck-tractor. From the safety standpoint there is a considerable improvement over the previous method. Unfortunately, however, this method had to be rejected due to the truck-tractor tandem axles being over limit by about 12,000 lb.

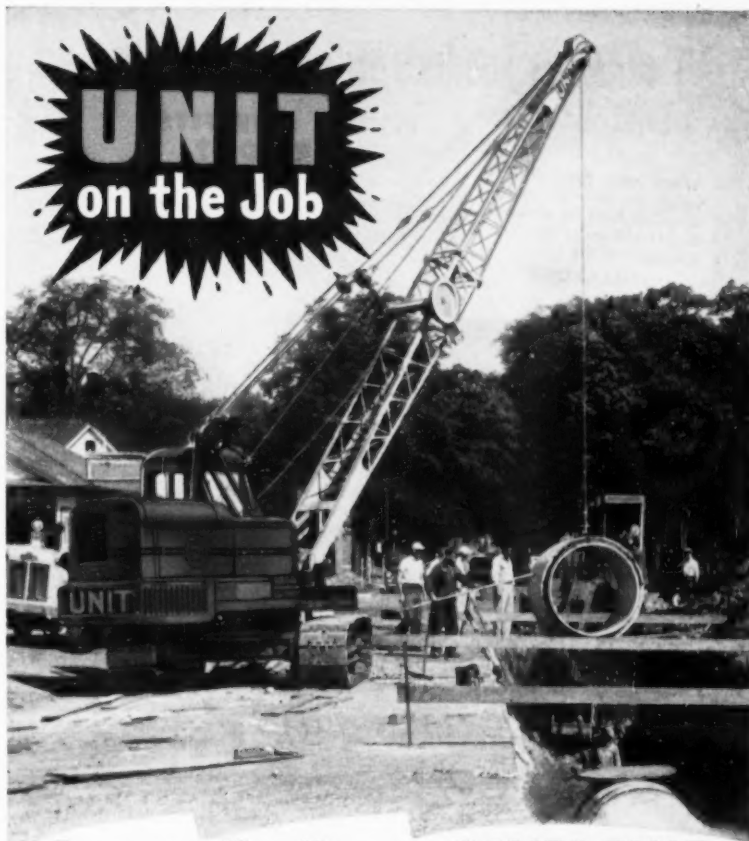
Equipment of this kind, of course, can be transported by disconnecting the tractor from the scraper and loading each part on a low-boy. Even though this method is costly and requires the use of elaborate handling equipment it has been used extensively for the lack of other entirely satisfactory means. The normal and logical method obviously would be to let these units transport themselves. A considerably lower G.V.W. would be involved and with better maneuverability, shorter length and brakes adequate for twice the weight involved, the safety factor would be greatly improved.

Obsolete Roads

Axle loading limits, of course, have been established with the intent to protect our highways. It may be of little moment in connection with the present discussion but it is interesting to note that most sub-grades and much of the surfacing which form our present highway system is of the "vintage" corresponding to early hard-tired earth moving equipment of a quarter century ago.

At the risk of straying somewhat from the subject, it may be of further interest to note that a highway surface is no better than the sub-grade supporting it and that the load carrying ability of a given surface can be improved substantially by proper employment of modern earth-moving equipment in the forming of more substantial sub-grades and improved drainage systems. Certainly the load carrying ability can be improved by increasing the thickness of the surfacing but at a considerable increase in cost over that resulting from an equal improvement in laying better sub-grades.

In considering costs of highway construction, it is again interesting to review some past history. Although accurate over-all figures are not available, it is a safe approximation that in the 1920's earthmoving jobs averaged between 5,000 and 8,000 cu. yd. of material moved with an average haul distance of 100 to 200 ft. at a price approximately averaging 20 cents per cu. yd. During the 1930's these relative figures were approximately 20,000 cu. yd. jobs at 300-ft. haul and 20 cents per cu. yd. price. From 1950 to date, jobs have averaged approximately 200,000 cu. yd. at 1,000-ft. haul and still at a price of little more than 20 cents per cu. yd. In view of the greatly increased cost of material and labor in this thirty year period, it is obvious



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that giant strides have been made in the art of earthmoving. Some of this is a result of improved methods employed by contractors as well as their demands for better and more maneuverable equipment. Much, however, can be attributed to an increase in size of earthmoving units.

On the other hand, contractors and eventually the tax payers pay an unnecessary penalty for transportation of these modern units. It is not uncommon to find construction jobs being bid in which the contractor has made provision for truck and rail transportation cost in amounts of 50 to 100 thousand dollars. This sometimes is as high as 2 or 3 thousand dollars per mile of constructed highway. True, this cost cannot be eliminated simply by removing axle load restriction and fees, but it is a place to start an economy move and would be a factor in expediting better roads programs. It can be argued: why lower the bars to such a small segment or minority group of the nation's public road users? That, in itself, in the light of this group's great contribution to any highway construction program weighed against the infinitesimal damage done, would appear to be reason enough for granting relief.

Large-tire Road Test

From a purely technical standpoint, many good arguments have been advanced on both sides of the question. Since not all earthmoving equipment is mounted or could be transported on large low pressure off-the-road tires, it is hardly fair in this discussion to draw comparisons as to the effect on road surfaces of these tires against the high pressure on-highway tires. In passing, however, it seems appropriate to suggest that in any future tests such as the Road Test one-MD conducted by the Highway Research Board, that a vehicle equipped with large off-the-road low pressure tires be included in the program.

In presenting this paper, the author freely admits that he is extending a sincere plea in behalf of the earthmoving industry for relief from restrictive laws that serve to handicap earthmoving operations which, directly or indirectly, includes a substantial amount of highway construction. It is not a selfish plea as obviously neither the manufacturer, dealer or the contractor has any intention of making a profit when moving equipment from the factory or dealership to a job, or from one job to another.

As indicated previously, some justifiable restraint is understandable in the interest of safety and to prevent undue damage to road surfaces. In view of this we, as engineers, should not relax our efforts toward improvements in transportability of our equipment within reasonable limits and without sacrificing the primary function of the machine which is, "move more yards at less cost."

\$1.2 Billion in Toll Projects Reach

Construction Stage

Another billion dollars' worth of big super road projects shaping up as result of busy legislative year.

TOLL ROAD construction work in progress stood at \$1,200,000,000 as of July 1 according to a report by the American Road Builders Association. Additional projects expected to reach the construction stage may swell this figure to \$1,650,000,000 by late Autumn, and some \$2½ billion in toll roads and bridges are expected to be built in the next three or four years.

In some states the toll road construction is exceeding the state road program. Nationally the ratio is gaining; during February, \$60 million was paid to contractors on toll projects as compared to \$80 million combined federal and state outlay for road construction nationally.

These are but a few figures indicating that the "toll road building era" has indeed arrived in this country. Upward of one-fifth or more of the money spent for highway construction in the United States this year, now estimated at a record-breaking \$3.5 billion, will be for toll projects.

Progress in Many States

Lt. Gen. Eugene Reybold, or ARBA recently reported to the House subcommittee on roads that 840 miles of toll roads were in service (as of early in July), 1,032 miles were under construction, and that a total of 2,350 miles of toll roads will be in operation at an early date.

Bringing up to date the legislative developments on toll roads ["Toll Road Proposals Bustin' Out All Over," R&S April '52], is the following summary of happenings in individual states.

Legislation authorizing or designed to pave the way for new or broadened toll financing of highway facilities has been enacted this year in 16 states—Colorado, Connecticut, Florida, Illinois, Iowa, Kansas, Michigan, Minnesota, Nebraska, New Hampshire, New York, North Carolina, Oklahoma, Texas, Washington and Wisconsin.

Similar bills are still pending at this writing in the legislatures of

Alabama and Pennsylvania; were rejected in California, Maryland, Missouri, New Mexico and Rhode Island, and vetoed in Arkansas.

Alabama: Headed for approval in the Alabama legislature, with no opposition in sight at this writing, was a bill providing for the creation of a state toll road authority, empowered to finance, construct and operate toll highway facilities. The plan was recommended by a recess legislative committee which made a study of toll roads after the 1951 legislature had sidetracked a toll road enabling act.

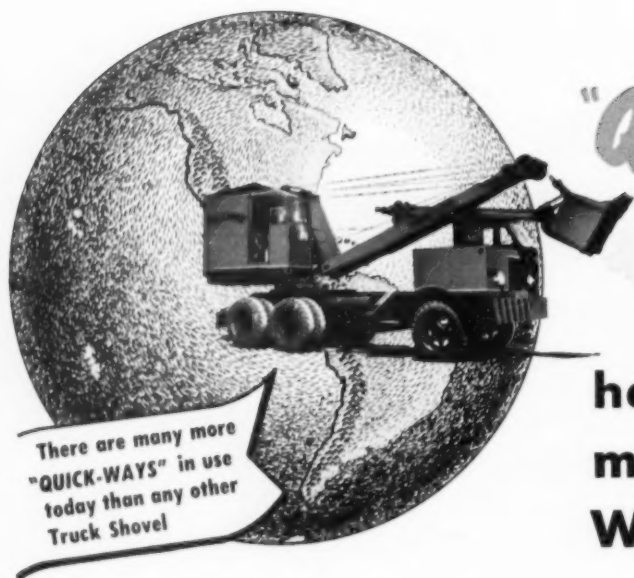
Connecticut: Bills enacted by the

legislature included a measure authorizing construction of the Fairfield County Thruway, to connect with the New York State Thruway at Greenwich and extend across eastern Connecticut to the town of Killingly at the Rhode Island border.

The act authorizes the state highway commissioner to set up a toll system on the thruway to pay off bonds to finance the project, expected to cost at least \$213,000,000. If the toll receipts prove insufficient, the measure provides that state gasoline taxes may be used to amortize the bonds. Enactment of the bill climaxed a two-year fight over the



★ Getting started on the West Virginia Turnpike project section held by Ralph E. Mills Co. and Morrison-Knudsen Co., Inc. Excavation 3,500,000 cu. yd. in 9 miles. Equipment on job includes 6 shovels (2½ and 3½-yd.), 29 rear-dumps, 26 heavy tractors, 5 motor graders, 6 dual-drum sheepfoot rollers, 12 compressors, 24 wagon drills, and other equipment in relation



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route of the projected thruway, parts of which already are under construction.

Also enacted in Connecticut was legislation calling for continuance of toll collections on the Merritt Parkway and Wilbur Cross Parkway after the bonds for those projects are paid in full as a means of providing additional revenue for highway construction elsewhere in the state.

Connecticut law heretofore provided for collection of the tolls only until the bonds were paid and directed that the toll money be used only for that purpose. The new act provides that the tolls collected after the bond issues are paid in full are to be used for the construction or maintenance of other state highways, including proposed expressways.

Advocates of this Connecticut legislation, which injects a new twist in the toll highway trend, declared that millions of out-of-state drivers use the toll roads each year and that continuation of the toll charges would relieve Connecticut taxpayers of much of the burden of paying for projected new expressways. They said the choice was between continued tolls or an increase in the state gasoline tax rate.

Florida: Enacted legislation providing for the creation of a five-member State Turnpike Authority to plan, finance, build and operate a toll superhighway to run northward 110 miles from the vicinity of Miami to Stuart or perhaps Ft. Pierce.

The new turnpike enabling act provides for further surveys as to the feasibility of a state-long toll superhighway, from Miami to the Jacksonville area, but the authority is restricted to constructing at this time the 110-mile leg north from Miami. Additional legislative action will be required for any extension of the turnpike, which will hinge on further engineering studies and will be financed by revenue bonds payable solely from toll receipts.

Cost of the short route is expected to approximate \$96,000,000, including \$5,000,000 for right of way. Cost of the full road has been variously estimated from \$250,000,000 upwards.

Shortly after signing the enabling legislation, Governor McCarty appointed the members of the new authority, with Earl P. Powers of Gainesville, a former State Road Board member, as its chairman and full-time executive head at a salary of \$12,000 a year. Other authority members will be unpaid.

Funds to cover the cost of engineering surveys and operating costs of the new Florida authority will be advanced by the State Road Department pending the issuance of revenue bonds.

Illinois: Legislature enacted bills providing for the creation of a three-member State Toll Road Commission,

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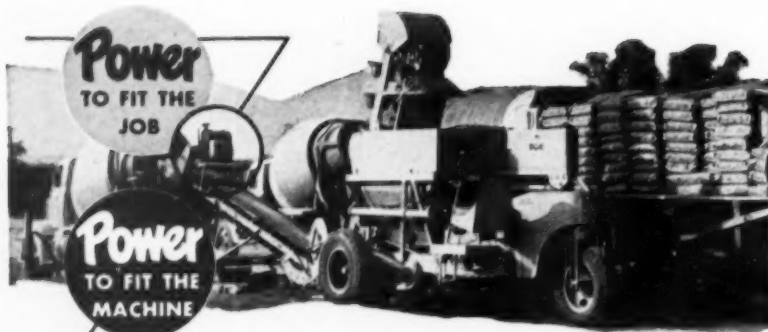
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empowered to finance, build and operate a system of toll superhighways in the state. The bills appropriated \$436,000 to pay the commission's operating expenses in the next two years and another \$64,000 to pay the salaries of commission members.

Indiana: Belief that revenue bonds for a \$165,000,000 toll highway across northern Indiana can be issued this fall was expressed by spokesmen for the State Toll Road Commission, following final approval of a route for the project, which will provide a link from the Ohio Turnpike to Chicago. Construction contracts for the two-year job of building the 149.9-mile, divided four-lane expressway are expected to be awarded next spring.

Iowa: Legislature adopted a resolution directing the State Highway Commission to make a study of the feasibility of toll road construction in the state. The commission, which will have \$50,000 for any "extraordinary expense" that may result, will report its findings and recommendations to the governor and the 1955 legislature.

The study resolution was adopted by the Iowa lawmakers as a substitute for a bill which would have set up a state toll road authority, empowered to issue revenue bonds to finance such construction if found feasible.

Kansas: A quick start on feasibility studies for a Kansas toll highway system was planned by a new seven-member State Turnpike Authority created by the 1953 legislature. State Highway Director Gale Moss is chairman of the new authority, which was empowered to study and, if found feasible, finance and construct toll highways. The agency was authorized to spend up to \$25,000 annually for its studies.

Regarded now as the most likely initial route is a turnpike from Kansas City to Topeka and then to Wichita, with a possible link with Oklahoma City later. Preliminary estimates were that such a route would cost approximately \$105,000,000.

Maine: First construction contracts for a 66-mile addition to the Maine Turnpike, now running 45 miles between Kittery and Portland, are expected to be awarded in August. The extension will run from Portland to Augusta and is expected to be completed in 1955 at an estimated cost of \$55,000,000.

Funds for the extension will come from a \$75,000,000 issue of refunding and extension bonds sold earlier this year by the Maine Turnpike Authority.

Massachusetts: Announcement by the Massachusetts Turnpike Authority of plans for the route of its projected \$200,000,000 east-west toll superhighway was being awaited.

Michigan: Legislature enacted a

bill providing for the appointment of a State Turnpike Authority empowered to issue revenue bonds for the construction of toll roads between Detroit and Chicago and Bay City and Toledo. It permits the authority to study other toll roads, but legislative approval will be required before others can be financed and constructed.

The new Michigan law includes a provision which would permit the authority to take over the expressway now being started as a free road between Detroit and Toledo. The bill provides, however, that the road must remain free unless approval for conversion into a toll route is given by the State Highway Department and the city of Monroe, both of which have issued bonds for the freeway construction. Monroe officials indicated that the city would never agree to the toll road plan.

Use of \$500,000 of State Highway Department funds for toll road studies, surveys and planning was authorized by the new legislation.

Nebraska: Legislature passed a bill providing for the creation of a three-member State Turnpike Authority, with the state engineer serving as ex-officio member. The bill empowers the new agency to issue revenue bonds, acquire rights of way and proceed with the construction and operation of toll highway facilities.

New Hampshire: New toll road laws authorize bond issues to finance construction of a \$23,000,000 Central New Hampshire Turnpike from Nashua to Concord and a \$13,500,000 extension to Rochester of the present Eastern New Hampshire Turnpike, which now runs from Portsmouth to Seabrook. A feature will be the operation of by-pass sections around Nashua and Manchester as freeways.

Following enactment of the legislation, Commissioner F. D. Morrill of the State Department of Public Works and Highways announced that every effort will be made to complete the two new toll road projects "within three years." As each section of road is completed it will be opened to traffic instead of waiting until the entire road is finished.

Extend Jersey Pikes

New Jersey: With \$60 million in contracts now in force, the New Jersey Highway Authority on July 9 sold to a nationwide investment banking syndicate a total of \$150,000,000 in serial bonds to finance construction costs to the end of this year on the 165-mile Garden State Parkway now under construction in 16 sections from North Jersey to Cape May. The project is scheduled for completion next year at an estimated total cost of \$285,000,000.

The way for permanent financing of the project was cleared when the

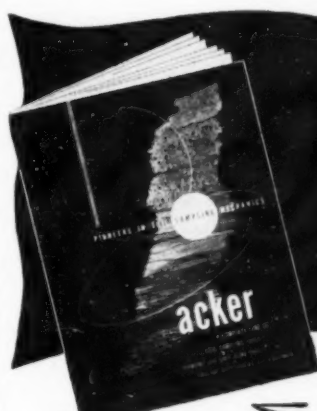
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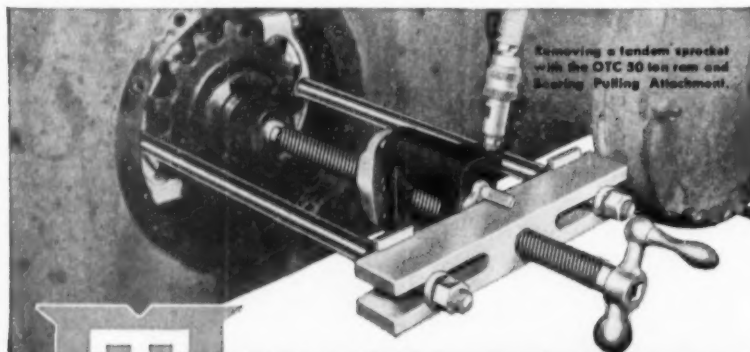
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State Supreme Court handed down an opinion in May upholding the constitutionality of a 1952 law pledging the state's faith and credit behind the authority's revenue bonds. New Jersey voters last fall approved the plan, which calls for payment of principal and interest on the revenue bonds from general taxation revenues if tolls on the parkway are insufficient to meet the debt. Additional financing under the plan may be sought later this year.

Pending the outcome of the litigation challenging the constitutionality of the parkway financing plan, construction had been proceeding under temporary financing procedures through short-term borrowing from banks. When completed, the parkway will run 185 miles from Cape May to the New York line, where a connection will be made with the New York Thruway. It has been indicated that the overall total costs connected with the project may run to \$308,000,000 instead of the original \$285,000,000 estimate.

Unsuccessfully introduced in the New Jersey legislature this year was a bill to authorize an extension of the New Jersey Turnpike to the vicinity of Atlantic City. Several other extensions of the turnpike, which is operated by the separate New Jersey Turnpike Authority, have been authorized under previously-enacted legislation and are currently under study. One is the \$100 million spur across Newark Bay. Another is the \$25 million link with the Pennsylvania Turnpike near Trenton.

North Carolina: Bills enacted by the legislature included a measure aimed at reviving a proposed toll road project along the Outer Banks of North Carolina. Providing for the creation of a four-member Carolina-Virginia Turnpike Authority, the new legislation was designed to meet objections raised by the State Supreme Court in invalidating a law under which such an authority was originally established.

Meanwhile, the North Carolina Turnpike Authority, a separate agency, is continuing its studies of possible toll highways in other parts of the state, including a proposed route from the Gastonia area, through the Charlotte area and west of Winston-Salem to the North Carolina line near Mt. Airy.

Ohio: The 241-mile Ohio Turnpike was scheduled to be placed under contract in a series of lettings, spaced at intervals throughout the summer totaling an estimated \$198 million. The first projects re-advertised following the court decision involving pavement types [June '52 R&S] were awarded at prices 17 per cent over the engineer's estimate. The second parcel of bids opened July 8 were rejected as being too high and a third letting postponed.

As this issue went to press, concern was felt over these unexpectedly high prices, although the Turnpike Commission still hopes to place all work by early fall.

New Pennsylvania Spurs

Pennsylvania: Proposed legislation would authorize another extension to the Pennsylvania Turnpike in northeastern Pennsylvania. The State Turnpike Commission is now making surveys in that part of the state to extend the toll highway system from a point east of Harrisburg, through the anthracite region, to the New York border near Binghamton.

The proposed new enabling act would provide for construction of a connecting link to a point to be decided by the commission somewhere along that proposed route. The connecting link could be extended eastward to the Delaware River and westward to the Susquehanna River, probably from the Wilkes-Barre-Scranton region to East Stroudsburg.

Sponsors of the legislation said construction of such a new link could facilitate the flow of traffic in the coal region and also connect with the New Jersey Turnpike should an extension of that highway be built in northwestern New Jersey.

Meanwhile, construction is continuing, with all major contracts now awarded, on a \$65,000,000, 33-mile extension of the Pennsylvania Turnpike from its present eastern terminus at King of Prussia to the Delaware River, half a mile south of Edgely, from which point a connection is planned with a projected link with the New Jersey Turnpike.

Texas: An administration-backed statewide toll authority bill enacted in Texas gives priority to a proposed Dallas-Fort Worth turnpike expected to cost \$30,000,000. The bill provided for gubernatorial appointment of six members of a nine-member authority with broad powers to plan, finance and construct toll road projects anywhere in the state. The other three members of the new agency will be members of the State Highway Commission.

Providing in its original form only for the creation of a Dallas-Fort Worth Turnpike Authority, the Texas bill was converted into a statewide authority at the insistence of Governor Shivers.

This summary will be concluded in September Roads and Streets, covering Oklahoma, Virginia, Washington, West Virginia and Wisconsin. With the contractors on the turnpikes and thruway projects—watch for reports in forthcoming issues or Roads and Streets.



★ A 15-mile completed section of the New York State thruway

New York Thruway Program Spotlights "Big Business" of Roadbuilding

THE unparalleled letting program for the New York State Thruway, totaling a third of a billion dollars in recent months, focuses on the rapid postwar growth of highway contracting. Congressional leaders now studying the Nation's traffic dilemma, state legislatures and Mr. Citizen are watching with interest the progress on the largest highway job yet undertaken, the Thruway from Buffalo to New York City.

As of July 1, contracts totaling \$321 million were in force along this 427-mile highway, representing 323 miles of the 427-mile main Thruway line along with most of the road's 525 bridges, and hundreds of miles of connecting roads, ramps and miscellaneous. About 55 miles of Thruway costing \$36 million was opened to traffic. Another \$50 million in contracts was set for early letting. As the jobs awarded gathered speed, earnings of the contractors rose to \$22 million for the first half, and are expected to exceed \$150 million for the 1953 calendar year.

Many "Big" Jobs

A tabulation of the Thruway jobs reveals a number of interesting facts. One is that the Thruway Authority has found it expedient to award numerous jobs in the "above five million" class, as well as smaller ones. Few projects, however, have involved prices of less than one million dollars. Some also run to unusual lengths, compared with traditions in other parts of the country. Projects or adjoining pairs of projects aggregating 10 to 20 miles or more of dual

expressways, together with dozens of major structures, play an important role on the Thruway. These bigger jobs are being watched by students of highway affairs, as offering special opportunity to achieve high over-all efficiency and speed with today's heavier equipment.

Heading the list of Thruway Contractors in dollar volume for a single contract is the American Bridge Company with two superstructure contracts for the bridge over the Hudson River, totaling \$32 million. Aside from this special project, the largest operator along the road is Lane Construction Company. This firm, considered to be the country's largest road-builder, has ten Thruway contracts totaling \$32.7 million and covering 38 miles of the road.

Next is Savin Construction Corporation, with \$26.9 million in work on six jobs covering 27 miles. Following is D. W. Winkelman, Inc., with \$19.5 million for 8 contracts covering 13 miles; and Perini with \$18.9 million, covering two adjoining jobs 13.3 and 8.9 miles in length.

Other substantial "pieces" of the Thruway include that of Mt. Vernon, Healy & Gammino, \$17.4 million on one contract covering 12.8 miles; Drake & Piper with four jobs at \$16.8 million; S. J. Groves & Co. with four at \$14.7 million; Merritt-Chapman & Scott with two at \$13.3 million; Bero Engineering Corp. with six at \$13.1 million; Arborio with two at \$12.0 million; Arute with four at \$11.7; and A. S. Wikstrom with four jobs aggregating \$8.2 million.

Fabrication and Erection Methods For All-Welded Expressway Viaduct

One of longest all-welded highway structures ever undertaken, this expressway bridge was erected under rigid inspection control. Modern shop and field procedures of the contractor are here described.

By H. H. Tarzian

Associate Bridge Engineer

and P. G. Jonas

Assistant Steel Inspector
California Division of Highways

ON THE MORNING of August 18, 1952, there began arriving near the corner of 17th Street and San Bruno Avenue in the City of San Francisco, the structural steel for the first leg of an extensive system of elevated viaducts planned for that city by the California Division of Highways. The first contract, called the 9th and 10th Street Connection, consists of two approximately parallel highway bridges,

each over one-half mile in length.

Other contracts, either now under way or planned for the immediate future, will add another two or more miles of elevated structure to the project. When completed, the viaduct will distribute and remove from congested streets much of the city's traffic from the Bayshore Freeway and the San Francisco-Oakland Bay Bridge.

No Rivets!

The steel arriving at the structure site that August morning looked very much like any other shipment of large built-up bridge members—with one exception. *There were no rivets!*

In other words, all built-up members, both primary and secondary,

were connected and spliced by welding instead of by riveting. This was the first time that all-welded construction was being used by the California Division of Highways on such a large scale.

The design of the viaducts called for piers, as well as superstructures, to be of structural steel. Piers were to consist in general of a cap girder supported by either one or two columns. Each column was to have a grillage base in order to distribute its load to a concrete footing. Two-column bents were to be rigid frames of the gallow's type, usually with overhanging caps. All single-column bents were to be "T"-shaped except Piers 9-22 and 9-23 which were "C"-

★ "C" bents as well as "T's" figure in the structure, which will be a link in the San Francisco area freeways

70



shaped. The superstructure in general was to consist of rolled beam stringers for spans up to 75 ft., and welded plate girder stringers for spans over 75 ft.—with transverse diaphragms between beams.

There were a few exceptions to this in that a rolled beam stringer with a welded bottom cover plate was used in a few locations for spans slightly over 75 ft. Inclined shear lugs attached to the top flanges of the stringers were to provide for composite action between beams and the concrete bridge deck. Connections of all members, even tension flange splices, were to be welded. [The complete design of this structure was described by Mr. Wendell F. Pond in an article in the April 1952 issue of Roads and Streets.] An excerpt of the specification for the base metal to be used is given in Table I.

Steel Fabricated Within Trucking Distance

The steel sub-contractors, Bethlehem Pacific Coast Steel Corporation, elected to do all fabrication in their Alameda, California, shops, located just across the Bay from the bridge site.

Steel deliveries began during November, 1951, from the eastern mills of the Bethlehem Steel Company. Bethlehem engineers in Alameda had already accomplished the detailing and planning necessary to fabricate the structures. To appreciate the complexity of these plans, it should be noted that more than 300 23x36 in. sheets of shop detail drawings and calculations were required in excess of the number of design drawings supplied by the Bridge Department of the California Division of Highways.

During the month of January, 1952, the actual fabrication of the steel began, and the months of careful planning of the welding sequences and details started to pay off.

Rolled Beam Stringers

The first pieces to be fabricated by welding were the rolled beam stringers. These consisted of 36-in. wide flange beams, with shear lugs welded to the top of the flange. The shear lugs were 1"x4"x10" placed at varying spacing along the beam. The bottom edge of the bars were cut to a 1 to 4 bevel so as to incline toward the center of the span. The stringers were inspected before welding of the shear lugs to take advantage of the existing rolled-in camber. They were then set up with the positive side to take the shear lugs. Therefore, any negative camber which might result from welding the shear connectors to the top of the stringers would be offset by the positive camber. Welding these lugs was accomplished by either semi-automatic or manual welding. So as to avoid locked up stress in

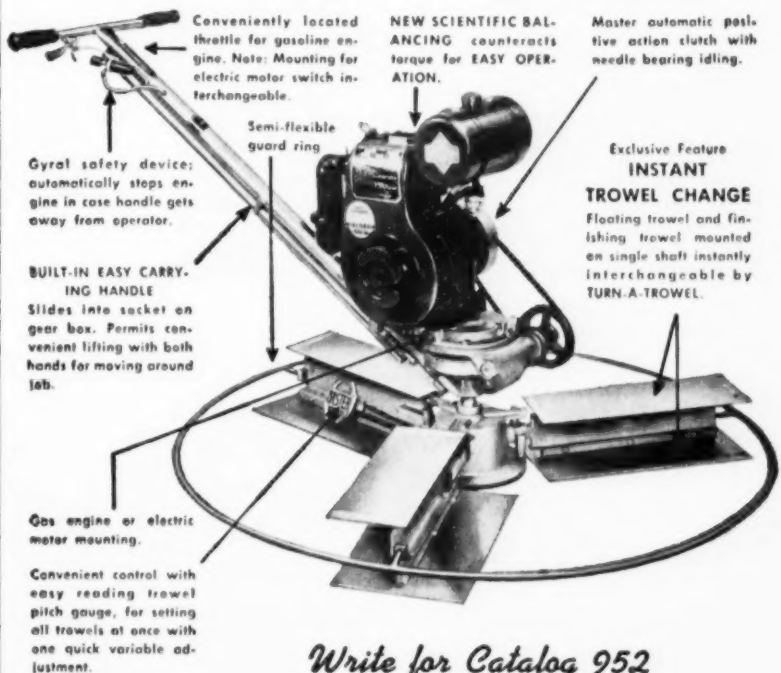
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★ Bold yet pleasing architectural effects have been obtained with the new viaduct here described, the largest all-welded structure designed by the California Division of Highways

the center portion of the stringer, welding of the connectors was started at the center of the span by two welders who worked uniformly towards each end.

The longitudinal shrinkage in the length of the stringer flange due to the transverse welding of the shear bars was of minor importance. By welding the shear connectors first, all other details such as diaphragms, connection bars, and bearing plates were accurately welded into position. An exception to this was when bottom flange cover plates were required on the rolled section stringers. In this case the cover plate was welded first by the automatic welding process and the shear lugs then welded in the same method as described.

The bottom flange cover plates for extra long rolled beam spans were generally about three-quarters of the stringer beam length and required a continuous 5/16-in. fillet weld.

The first of these beams were welded by the semi-automatic process. But as the job progressed, the fabricator found that by welding with the automatic process and also preheating the flanges and cover plate edges to a minimum of 140° F., he could get greater production of welding speed (inches per minute) and a more uniform stringer. This also resulted in better quality of weldment.

welded in three separate assemblies, on flange plate and two flange side plates. These were fitted up by the use of jigs and tack welded. The assemblies required continuous fillet welds $\frac{1}{4}$ ", $\frac{3}{16}$ ", $\frac{5}{16}$ " or $\frac{1}{2}$ " full length of the column flanges, depending on the size and shape of the particular column. The welding of the column flanges and flange side plates was accomplished by the automatic submerged arc welding process.

Preheating was also used ahead of the automatic welding head on these assemblies. Preheat ranged from 138° to 300° F. to suit the geometry of the particular unit being welded. This enabled the fabricator to obtain fast welding speeds (inches per minute) while producing defect-free welding with minimum distortion of the weldment.

Column Assembly Fabrication

The column web assembly, consisting of a wide web plate and two split tees, was welded with four longitudinal welds made with the automatic submerged arc. The continuous weld was started at one end and run the full length of the section thus welding the split tees to the web plate.

In some cases the split tees were not used; here beams reinforced with channels were fitted and welded to make up the subassembly. This subassembly was welded to the web plate in the same manner the tee sections were.

After the subassemblies were made up they were fabricated onto a complete column. They were fitted together, lined up with pipe jacks, joined by welding the flange members to the web units, then completing the weldment with the two column base members.

When welding the web member to the flange members, semi-automatic submerged arc welding and manual shield arc welding were used. For welding the two base members, manual shield arc welding was used entirely. In any one weldment each fillet placed by the automatic submerged arc process in all cases was run in the same direction and from the same starting point. This proved to be good fabrication practice since it was one of the important factors in the control of the tendency of the long continuous welds to rack and twist the built-up plate girder.

Column Fabrication

The columns were the next unit to be fabricated. They were first constructed as five subassemblies and then connected into one unit. The column bases were simple in design and exercised no problem in fabrication. The welding was accomplished by manual welding using A.S.T.M. Designation E6012 or E6016 (low hydrogen) electrode.

The typical column flange was



★ Welding shear lugs to the 36 in. wide flange beam stringers with the semi-automatic welding process



★ The first unit of the viaduct system, recently completed is shown by the single cross hatching

stringers, cap girders, and columns.

Cap Girders

The various cap girders, depending on double or single bent type, ranged from 28 ft. to well over 75 ft. in length. Web plates were $\frac{3}{8}$ ", 7/16" and $\frac{1}{2}$ " in thickness and normally 54" in width, and the flanges ranged from 1 $\frac{1}{4}$ " up to 2 $\frac{1}{2}$ " in thickness.

The fabrication of the cap girders all fell into the same general pattern, the top flange being fit and welded followed by the bottom flange. When the web plate had to be spliced it was done before laying out. The web splice was welded by the manual shield arc or by the semi-automatic submerged arc method. After welding, the web was laid out and cut to shape by oxyacetylene cutting after which all edges were ground. The top flange was then fitted to the web of the cap girder and tack

welded in place. This portion of the cap girder was then set up under the automatic welding machine. Before welding, preheat was started on the end on which the welding would begin. When the preheating was up to the required temperature, welding would start on the flange-to-web fillet weld, keeping the preheat ahead of the welding process. A balanced heat control was maintained at all times during welding and cooling.

The typical bottom flange of the cap girders was made up of five plates welded together.

Plates A and B were joined by welding in the flat position with the semi-automatic welding process. After the welding of the top flange to the web of the cap girder, the girder was repositioned and the bottom flange attached by means of a semi-automatic welding machine.

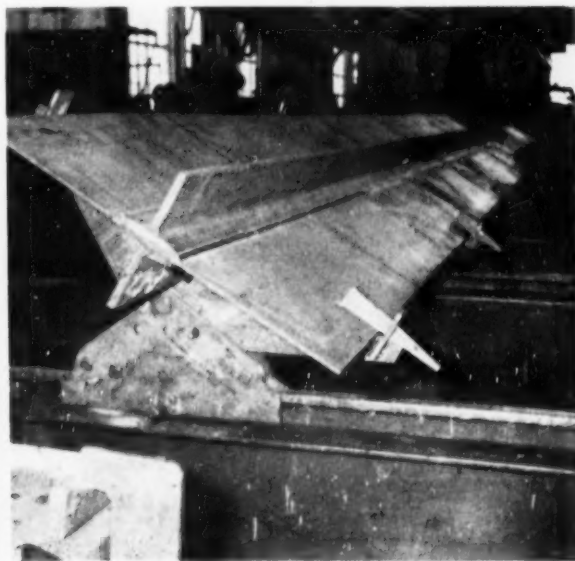
The bottom flange was welded in

three sections to the cap girder. The Sections B acted as bearing plates for the columns and were usually of thicker and wider material than the balance of the flange. They were first welded to each end of Plate A. This unit was then welded to the web. Plates C were then connected into position by first butt welding to Plate B and then fillet welding to the web.

Here again a minimum preheat of 140° F. was used to control welding. The welders, one on each side of the web, welded from the middle of the flange of web Section A to the end of Section B, repeating for the opposite end. The welders were staggered 12 in. apart for welding control. After this section was welded, Section C of each end of the girders were prepared and fit up to the web. The butt joint of Section B to C were welded by the semi-automatic weld-



★ Shear lugs also welded by the manual welding process with E6012 electrodes. Preheat was used



★ Column web assembly showing the web plate and the two split tees which were welded automatically

ing process before any tacking of flange C to the web. After this butt weld was completed, the flange was then tack welded to the web and semi-automatic welded in the same way as for Section C, but starting the fillet welds at Section B and welding out to the end of the girder. After welding the bottom flange sections, the girder was then turned on its side and fitted with stiffeners and beam seat assemblies welded with semi-automatic or manual process.

Built-Up Girders

The built-up plate stringers were welded using both semi-automatic

and manual welding. The web plates were spliced together in three sections making up the 106-ft. length. A 2-in. positive camber was built into the web so that when the flanges were spliced and fitted to the web the positive camber would be on the top. This positive camber was needed to counteract the negative camber caused by the welding of the shear lugs.

Small parts such as diaphragms, stiffeners, keeper plates, rocker assemblies and step brackets were all fabricated separately and stock-piled and drawn on when needed for the final assembly.

No Erection Falsework

As soon as the fabricated steel began arriving on the job, erection was started, and was geared to keep up with the deliveries.

All members were hoisted into place from the ground by crane, and were at first loosely held in position by temporary erection pins and bolts. Before welding, any pins used were replaced by bolts, and all bolts tightened. Plans called for these erection bolts to be removed after welding, and their holes plugged. By special permission, however, bolts in superstructure diaphragms were left in place in the finished work. All other fitting-up bolts were removed.

Erection progressed very rapidly partly because the beam span type of design required no falsework. The contractor considered using shores under the cantilevered caps of Piers 9-22 and 9-23, the "C"-shaped bents, but later decided instead to support the free ends of these caps with the crane until the other ends were bolted up and welded sufficiently to hold without the support of the equipment or any shoring.

In order to keep the necessity for field splicing to a minimum, all main members had been shop-fabricated full-length, even though this created the difficult trucking problem of having to haul, in one piece, girders up to 106 ft. in length. Thus most of the important stress-carrying welds were made in the shop where better welding conditions existed.

Primary welds which had to be made in the field were (1) columns to cap girders, and (2) in the case of Piers 9-22 and 9-23, columns to cap girders, and grillages to columns.

Field welds of secondary importance were at the following locations: (1) diaphragms to stringer stiffeners; (2) rocker bearing keeper plates to stringer flanges; and (3) at certain locations, tie bars and braces to stringers and to cap girders.

Low Hydrogen Electrode Used in Field Welding

Field welding started as soon as the first few shipments of steel had been erected, and followed as close behind erection as possible. A small crew, working just ahead of the welders, moved members into position and tightened fitting-up bolts. The use of jacks, wedges, "come-alongs," and "C"-clamps for aligning and holding members was required at a few locations. In general, however, the fitting-up bolts, and the member's own weight, would hold it in place, or welding heat would draw it into position.

All welding in the field was done manually. Progress was fair, although at times there was a shortage of qualified operators.

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cations of prospective welders were conducted at the job site by inspectors of the Division of Highways. The first step in these tests was to examine any certification or recommendation papers that the welder might possess. Then regardless of his previous qualifications, the prospective operator was required to make a vertical fillet weld which was broken and inspected for root penetration, slag inclusions, undercut, etc. During the test he was also required to weld, under close scrutiny, in the other positions in which he would be called upon to work on the structures, and with the types of electrode that he would have to use.

If the man satisfied these preliminary inspections of his work and technique, he was given the standard butt weld and fillet tests outlined as Appendix D, Part II, of the "Standard Specifications for Welded Highway and Railway Bridges, American Welding Society, 1947," and if his test plates were satisfactory, was allowed to start work.

Success in a test did not necessarily qualify an operator for all times. During the course of the work, welders whose performances seemed to no longer measure up to standard were given re-tests.

Also, because specifications do not set up a minimum time interval to be allowed for the test, some men, by taking plenty of time, could make fine test plates. But under actual working conditions on the bridges, and under pressure of producing quantity as well as quality, their performances would sometimes turn out to be unsatisfactory.

All field welding was done with 300-ampere, direct-current, arc-welding machines—one machine to each operator. This equipment was spotted on the ground under the bridges, with leads extending up to the superstructure. Machines were moved ahead as the work progressed. Upon several occasions during the work as many as ten machines of varying ages and mechanical condition were operating at the same time. To keep this equipment in good repair and producing a constant arc heat required careful maintenance.

In the welding of material one inch or greater in thickness, 5/32 in. coated electrode conforming to E6016 (low hydrogen) was used for filler metal. Diaphragms and other members less than one inch in thickness were welded with E6010 coated rod in either the 5/32 in. or 3/16 in. sizes. Many of the operators had never used the E6016 (low hydrogen) rod before, and had trouble qualifying for its use. But those who did qualify seemed to get accustomed to its peculiarities in a few days of welding. Only the best welders were allowed to do the low hydrogen work.

Oven Dried Rods

A specification requirement for the use of low hydrogen electrodes was that the rods must be dried in an oven if their coatings had been allowed to absorb moisture. The contractor maintained at the site a 300° F. thermostatically-controlled electric oven into which he placed these rods after their removal from the shipping containers. In fact, as the job progressed, he started placing even the ordinary electrodes in this oven before use. He found that oven-dried coating caused less bubbling, arc blow, undercut, and other defects.

Preheating of base metal was re-

quired wherever plates or shapes to be welded were 1½ in. or more in thickness. A neutral acetylene-oxygen flame applied by means of a wide heating tip provided the heat. The required 300° F. temperature was checked before and during welding by means of a crayon-like stick called Tempilstik. Steel heated to 300° F. or hotter would, upon contact, melt the material of the crayon.

In welding columns to cap girders, operators worked off of ordinary riveter's platforms, suspended by manila ropes. Diaphragm welds were placed with the welder sitting planks supported on lower stringer flanges.

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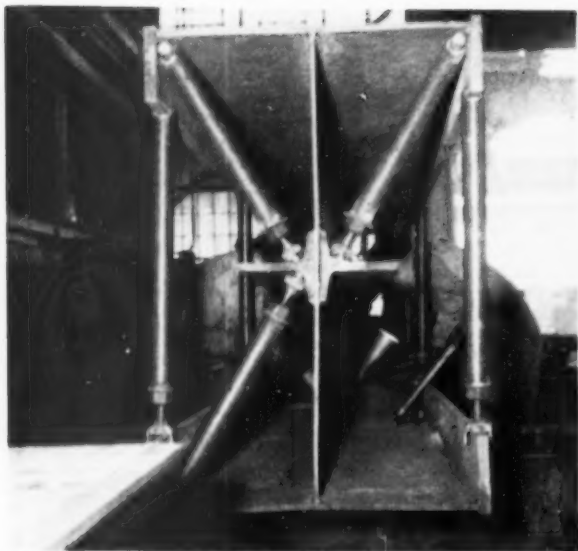
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★ Welding a column after tack welding, with line up jacks in place. For welding control two welders worked simultaneously 12 to 18 in. apart in same direction



★ Automatic welding of a bottom flange section to a cap girder. Top flanges were welded in the same manner, preheating ahead of automatic welding

The most important field welding of the project was done at Bents 9-22 and 9-23, the "C"-shaped bents. At these locations certain of the field welds will have to carry the entire moments of the cantilever caps and of the cantilever grillages. Extreme care was taken in making these welds, especially those on the tension sides, with special consideration being given to proper sequences, the cleaning of each pass, simultaneous welding of opposite sides of joints, proper preheating, etc.

The erection and field welding of the 9,700,000 lb. of structural steel in this first contract were completed on January 3, 1953, four and one-half months after the first steel arrived on the job.

Tests and Inspection

Over the past years the inspection of structural welding has more or less standardized to the qualification of the welders, procedures and materials, followed with close inspection by a qualified inspector. One inspection was supplemented with penetrant dye, trepanning, hardness testing and radiographic inspection.

Preheat where required was controlled through the use of temperature sensitive crayons and surface contact pyrometers.

During the course of welding operations, both in the shop and in the field, radiographs were made of all major butt welds and of a small percentage of the fillets. Any defects or

cracks revealed by radiographic observations were corrected.

The Division Street Interchange was designed and the construction supervised by the Bridge Department of the California Division of Highways under the direction of F. W. Panhorst, Assistant State Highway Engineer. The shop fabrication was inspected by the Materials and Research Department and was under the direction of J. L. Beaton, Supervising Highway Engineer. The field erection was directly supervised by the senior author of this article and the inspection of welding was carried out by the junior author.

The General Contractor for this 9th and 10th Street unit was Charles



★ Welder working on ordinary riveter's platform suspended by ropes for welding cap girder to columns



★ Typical method of welding diaphragms to stringers. Welder worked off planks supported between the lower stringer flanges, sliding planking along

L. Harney, Inc., of San Francisco, with the fabrication and erection of structural steel being sub-contracted by Bethlehem Pacific Coast Steel Corp. of Alameda.

TABLE I
Excerpt of Specification for the Structural Steel Used

Bars and shapes, and plates $1\frac{1}{2}$ in. and less in thickness shall be structural steel conforming to the specifications of the American Society for Testing Materials, Designation: A7-49T.

Plates greater than $1\frac{1}{2}$ in. in thickness shall be of steel made by either or both of the following processes: open hearth or electric furnace.

The steel shall conform to the following requirements for chemical composition, as evidenced by the specified ladle and check analyses, respectively.

	Analysis—%	
	Ladle	Check
Carbon, max.	0.29	+ 0.04
Manganese	0.60 to 0.90	± 0.04
Phosphorus, max.	0.04	+ 0.01
Silphur, max.	0.05	+ 0.01
Silicon	0.15 to 0.30	+ 0.03
		— 0.02

The material as represented by test specimens, shall conform to the following requirements as to tensile properties:

Tensile strength, psi.	55,000 to 65,000
Yield point, min., psi.	27,500
Elongation in 8 in., min., %	21

The bending properties, as represented by test specimens, and the number of tests shall conform to the requirements specified for structural steel, ASTM A7-49T.

The grain size shall be from 5 to 8 in accordance with ASTM E19-46.

With the Manufacturer

New Cummins Engine Dealership. Cummins Rio Grande Sales and Service, Inc., has been organized to handle the former Albuquerque, N. M. and El Paso, Tex., operations of Cummins & Moran, Phoenix, Ariz. The president of the new Southwest Cummins Dealership, which covers New Mexico and El Paso, and Hudspeth and Culberson Counties, Texas, is A. S. Leonard. J. D. Kennedy is vice president. Headquarters at 1921 N. Broadway, Albuquerque, with a branch operation at 600 Cole St., El Paso.

Reishus Elected Vice President. Harold T. Reishus, general manager of Industrial Power Division of International Harvester Co., Chicago, Ill., since its formation in 1944, has been elected vice president in charge of the division.

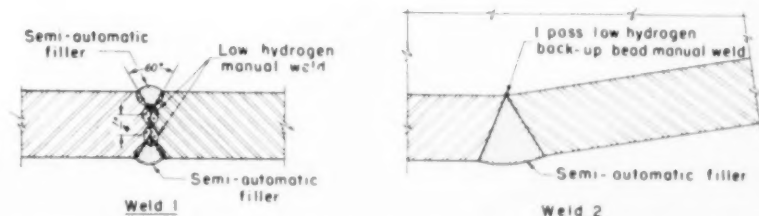
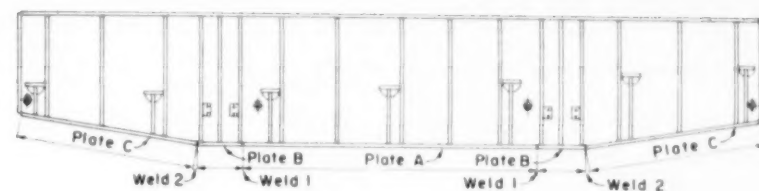
Thurman Appointed District Manager. Robert C. Thurman has been appointed district manager in northeastern section of the United States by Marmon-Herrington Co., Indianapolis, Ind.

Shunk Appointments. Warren B. Irish has been appointed regional sales manager for Shunk Manufacturing Co., Bucyrus, O., representing the company in Ohio, western Pennsylvania and West Virginia. Larry Elaw has been appointed office sales manager, and Oscar C. Gelser has been placed in charge of customer relations for the company.

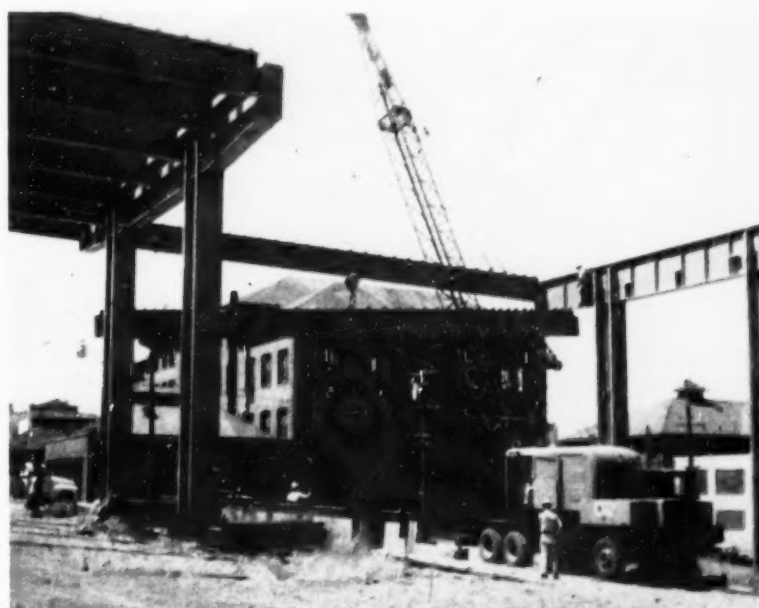
★ All members were hoisted into place from the ground by crane and held in temporary position with pins and bolts for welding



★ Typical method of sticking butt welds of the bottom flanges for radiographic inspection



★ Figure 1—typical welding details (see text for reference)



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Legal

Overtime in Road Building

By Albert Woodruff Gray

A Missouri firm was engaged in the quarrying and crushing of rock, which was sold by them to road contractors for the repair and maintenance of highways and river dikes in that state. None of this rock was shipped out of the state but used only in the repair and construction of roads that were used in interstate traffic. The employees of the company however,

applied this material neither to road construction or dikes.

An action was brought against this employer for a violation of the Wage and Hour Act, claiming the employer had failed to maintain records as required by that statute and had failed to pay the statutory wages for work hours in excess of 40 hours a week.

The statute is that, "Except as otherwise provided in this section no employer shall employ any of his

employees who is engaged in commerce or in the production of goods for commerce for a work week longer than 40 hours unless such employee receives compensation for his employment in excess of the hours above specified at a rate of not less than one and a half times the regular rate at which he is employed."

The defense of this firm was that the production of crushed rock within the state, sold entirely within the state and used by the purchaser within the state for the maintenance and improvement of roads and a river over which interstate commerce moves, was not the production of goods for commerce within the meaning of this statute.



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This same question came for review before the Supreme Court several years ago. In reference to the application of the statute to employees not directly engaged in the production of goods for interstate commerce but employed in work affecting such activity, that court said in its decision,

"This does not require the employee to be employed even in the production of an article which itself becomes the subject of commerce or transportation among the several states.

In its decision that the employer of these employees engaged in the production of crushed rock, although neither their labor nor the product was applied by them to interstate roads, but sold to others who did so apply it, were subject to the provisions of this statute, the court said,

"It has been established that the repair of interstate facilities constitutes commerce within the meaning of the term as used in the Fair Labor Standards Act and employees working on and maintaining roads and bridges carrying interstate traffic, docks in the Mississippi River, telephone conduits containing circuits carrying interstate calls and railroad signal towers, have been held to be engaged in commerce.

"The Fair Labor Standards Act was designed to extend the frontiers of our social progress by insuring to all our able bodied working men and women a fair day's pay for a fair day's work. Any exemption from such humanitarian and remedial legislation must therefore be narrowly construed, giving due regard to the plain meaning of statutory language and the intent of Congress."

Tobin v. Johnson, 198 Fed. 2d 130, Missouri, Roland Electrical Co. v. Walling, 326 U.S. 657 29 U.S.C.A. 207

Surveying manual revised

Principles & Practice of Surveying; Breed & Hosmer. Volume II, Higher Surveying. 7th edition. Latest in a series dating from 1908, this edition has been extensively revised and brought up to date to incorporate latest practice on such subjects as photogrammetric surveying, barometric leveling, hydrographic surveying, etc. Price \$7.00. John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y.

AGC to hold mid-year board meeting in Chicago

The governing and advisory boards of the Associated General Contractors of America, Inc., will hold their annual mid-year meeting Sept. 14-16 at the Edgewater Beach Hotel in Chicago. An attendance of 350 is expected including the presidents, secretaries and managers of the AGC chapters and branches.

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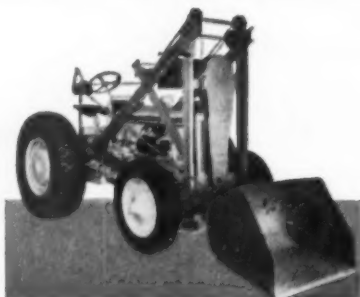


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Pavement saw speeds removal of old asphalt pavement

"This particular job almost nailed my hide to the wall," comments Chester S. Yardley of Santa Rosa, California. The job consisted of sawing 1800 lin. ft. of 9 in. asphalt macadam base to a depth of 3¾ in. Yardley's crew tackled this job using a Clipper Model C-130 concrete saw and a diamond blade. Although the 3¾ in. deep cut specified by the city was greater depth than is usually required, the job was completed in only 12½ hours, an average of 2½ ft. per minute.

This sawing was done in order to facilitate the removal of a center section of E Street in Santa Rosa, where an abandoned water main had caused the pavement to settle. Sawing before removing the failed area made possible a faster job and left straight, smooth shoulders to which to pour back the replacement material.

The city also specified that "free flowing traffic" be maintained. This was accomplished by completing all sawing before commencing with the "break out." Another obstacle that had to be overcome was the possible rejoining of the asphalt at the cut which might result from the wheel traffic of heavy trucks and the 90 degree summer heat. To prevent this, Yardley sifted fine sand into the finished cut.

Yardley recently used his saw to cut a trench in a narrow concrete ramp. By sawing before break out the damaged area was removed without disturbing the adjacent flooring or upright supports.



★ Power saw made short work of asphalt crust

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AUGUST, 1953

Turner Turnpike's Home Stretch

Much of the 88-mile toll road between Tulsa and Oklahoma City was paved during winter months, when bituminous work usually is not attempted in this state. Contractors worked overtime, and took advantage of good weather periods, to get the road ready by the scheduled opening day in May.

TURNER Turnpike was opened to traffic in May—an 88-mile, 4-lane, divided toll road between Oklahoma City and Tulsa. What many motorists might not realize as they roll down this newest of turnpikes, is the speed of the "home stretch" construction which made this opening possible.

Seldom has such an accelerated construction program been carried on at once in this country to complete a road on time. The pace was a fast one even for toll roads, where early beginning of toll collection is urgent.

Background for the "home stretch" construction peak shaped up gradually. When the turnpike was first located, there was a 2° 30' curve at Sapulpa, and one of the big delays came in getting this location changed so that a bad dog-leg could be straightened out at Sapulpa. It took months. A shortage of steel also entered the picture. There was a time when a special allocation of steel had to be secured for use in Turner Turnpike structures during one hectic quarter, to bolster progress. Weather did the rest. By the time the winter of 1952-53 came around, it was ap-

parent to everyone that a seemingly impossible speed—especially in regard to paving—would have to be achieved to finish the job in the spring of 1953.

Everyone Anxious

Meanwhile, natural anxiety existed on the part of bondholders in the privately financed road to get the job done as quickly as possible so that revenues could start as the road began to serve traffic.

The answer to all these factors was a scale of winter and early spring activity which is a tribute to contractors and their equipment participating during these late stages. Oklahoma's winters are seldom mild enough to contemplate big-scale road-building, but somehow the job was done. One contractor, working against time, shut down only for three of the worst days in the whole winter. Others, harassed by wet shoulder material which had to be stabilized with asphalt, used a unique method to be detailed later, and passed all that material through a hot plant drier.

Other contractors put on extra asphalt finishers, stepped up their driers, and with these and other

speed-up devices maintained a sustained production rate of a mile of 24-ft. pavement a day and more. Pay-rolls on practically everybody's job showed overtime and Sunday work.

With the exception of the winter factor, it was a favorable paving set-up nonetheless. All of the route was on a new location, so traffic from parallel U.S. 66 was no problem. Grading was finished. Design was typical: two 24-ft. asphaltic concrete lanes separated by a 15-ft. grassed median, with 12-ft. bituminous shoulders. All paving contracts were written alike, which made inspection more uniform and made for paving speed. The 7-in. crushed stone flexible base under the hot mix pavement held uniform over the entire job, as did 12-in. of select soil, highly compacted. Such was the stage set for Operation Highball shortly after Christmas, 1952.

Paving Job Detailed

An example of one of the 13 paving contracts which were active practically up to opening date was that for an 8-mile section, centered around Bristow, which was held by Amis Construction Company of Oklahoma City. Amis' work, like all other paving contracts, called for preparation and placement of the 7-in. crushed rock and soil-binder flexible base course, 3 in. of coarse-mix asphaltic concrete base course paving, 2 in. of asphaltic concrete surfacing, shoulder stabilization with asphalt, median construction, and other appurtenant work connected with clean-up and roadside seeding. The contract amount on the Amis contract totaled \$941,343. A major item was 70,000 tons of hot mix asphaltic concrete.

Like many other paving contractors on Turner Turnpike, Amis Construction Co. handled the crushed rock base course work by sub-contract. The work was sublet to H. D. Youngman Construction Co. Youngman, who served many of the contractors on the turnpike, came to be somewhat of an expert in the installation of this material. Gradation requirements for the rock sub-base called for a 2-in.-minus aggregate, graded down along standard lines (30 to 60 per cent passing the No. 4 sieve),



★ Power brooming—cleaning asphaltic concrete binder course in preparation for placing surface course on Turner Turnpike section

with from 5 to 15 per cent of tolerance passing the No. 200 sieve.

Youngman located crushing and screening equipment in several pit sites as high as 10 miles from the work, and in line with what the organization had done for other contractors, stockpiled as much material as possible ahead of time. The pressure of speed in the later stages, however, caused stockpiles to dwindle and trucks finally were hauling direct from the crushers as rock plants worked overtime and week-ends.

During the grading operation, the select earth-course had been put down 16½ in. thick, and was well compacted. The extra 4½ in. was there for a purpose. It was placed at the time of grading so it would be available for bituminous-treated shoulders and center median later on. As a part of Youngman's subcontract, therefore, this 4½ in. of material was bladed aside. The crushed rock base material was hauled in in two identical 3½-in. lifts, spread, sprinkled if necessary, blade-mixed to get even distribution of rock particles, laid down, and rolled by pneumatic and steel-wheel rollers. The base was sealed with 0.35 gal. per sq. yd. of MC-1 asphalt.

Much of the credit for speed in these later construction stages can go to the Youngman organization. With one eye cocked on weather, construction sections were opened up carefully, worked rapidly, and sealed off fast by pneumatic rollers if rain was in the offing. Sections generally 1,000 ft. long were worked at one time. By planning the removal of the upper 4½-in. soil layer to coincide with rock hauling and half-way decent weather, work was possible in speed patterns previously unheard of in an Oklahoma winter.

Hot Mix Pavement

Placement of the rock base was no more rapid than the asphaltic con-



★ Pneumatic roller working in late stage of subgrade preparation, in advance of placing crushed rock base

crete paving which was done by Amis Construction Co. Amis moved into the 8-mile job just as the 1952-53 winter was coming on, with prospects brighter for trouble than anything else. Obviously the highest possible capacity setup was indicated, not only for the asphaltic concrete paving but for the production of mineral aggregate for the mix. To make the aggregate production job doubly interesting and difficult, one of the sites involved a 17-mile dead haul.

Rock production was planned, however, on the basis of 200 tons per hour sustained production on ¾-in. crushed material. Five reduction units were embodied, consisting of a Pioneer Model 153 plant with 30 x 42 jaw crusher equipment, a secondary 18 x 36 jaw crusher, a Pioneer 54 x 24 triple roll, and a complete Pioneer 46-VE rock plant embodying both jaw and roll equipment. Driven by diesel engines and electric motors, the plant

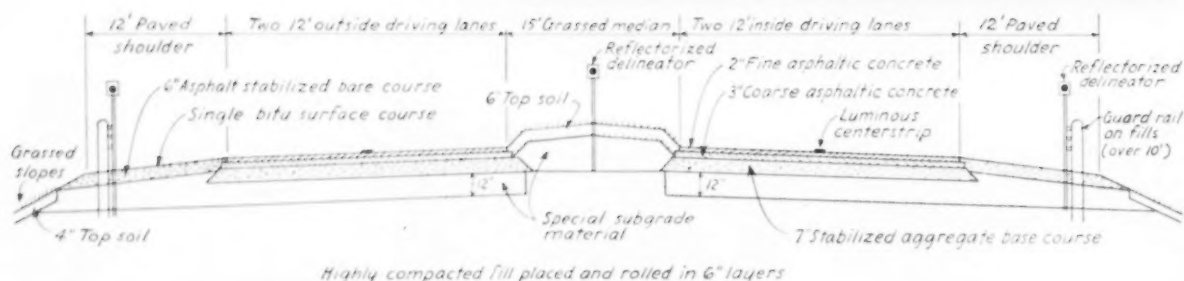
maintained production rates fully consistent with the ambitious schedule.

Mineral aggregates for the Type "A" base course asphaltic concrete mix consisted of a 1½-in.-minus material, with 3 to 7 per cent passing the No. 200 screen. From 4½ to 6½ per cent of 85-100 penetration asphalt was used. Type "B" surface material called for a ¾-in.-minus rock, with from 4 to 8 per cent passing the No. 200 screen, and 5 to 7 per cent of 85-100 penetration asphalt. Achievement of a good mix was possible with 3-bin asphalt plant separation.

Asphalt production was maintained at 185 tons per hour, this volume being made possible partly in the equipment, and partly by the interest and competence of the men. Fred Tarver, the operator of the Model 101 Pioneer Continuflo plant which Amis assigned to the job, is a quiet, conscientious



★ The Amis firm's plant, which was a Pioneer, with Marion crane on the aggregate piles



★ Cross-section of pavement and subgrade for the Turner Turnpike

man, devoted to his professional competence about as much as he is to his family. John Waugh, general superintendent, is also known as one of the best roadbuilding superintendents in Oklahoma. There was never a morning through the cold, wet winter and spring that these two men were not out, often hours ahead of the first crews, analyzing weather reports, heating up the plant to full operating efficiency before the start of the shift, or making minor adjustments or repairs if weather was too unfavorable to give a good paving job. The balance these men achieved between production on one hand and care of their plant on the other was an important factor in finishing on time.

Other than that, the set-up of the Pioneer plant was conventional. The job was located so that a central location near Bristow took care of the entire paving job. Asphalt came to Bristow by truck from a refinery at Stroud, Okla. Amis used natural gas firing for the hot plant, and the resulting efficiency was so good that 6 per cent mineral aggregates moisture was removed in the cold, wet month of February at a sustained rate to

support the production of 185 tons per hour. By taking every possible advantage of the weather, even in February, Amis laid 29,000 tons of paving mix that month.

Like many of the other contractors on Turner Turnpike, Amis laid the asphaltic concrete with two finishers to insure against delays at that end. The pair of machines working in adjacent lanes, also performed the desirable purpose of leaving the centerline virtually without a visible joint line. Laying both 12-ft. strips simultaneously and bringing up the rollers promptly is believed responsible for the excellent densities obtained not only in the center of the lanes, but along the longitudinal joint.

Noteworthy Shoulder Job

One of the most interesting situations encountered by the contractors was one faced by Cole Carley Hudkins Co. near Chandler, on which contract Peter Kiewit Sons Co. were subcontractors. The highway at this point passes through terrain which is low and exceptionally wet in winter. It was definitely one of the unusual sections of the turnpike. By late spring the pavement was down, but

with the dedication date rapidly approaching, the select shoulder material which had to be stabilized with 6½ per cent of 95-100 penetration asphalt lay wet and soggy to one side of the road. Repeated attempts to dry it up by aeration had only added to the cost of handling the material. To provide alternate types of shoulder construction the Turnpike Authority on May 13, 1952, had approved two alternates; one stabilized aggregate base and the other hot-mix, hot-laid soil asphalt shoulders.

In the belief that the big dryer of their Pioneer 101 asphalt plant would take it, the contractors officials adapted the hot-mix, hot-laid soil asphalt alternate which several other contractors later followed. The shoulder material was picked up by a DoMor loader on a Caterpillar No. 12 motor grader, trucked in to the plant, run through the dryer, and as high as 10 per cent of moisture was taken out. The material was then passed through the plant pugmill, where the asphalt was added. An excellent mix was turned out. The mix was trucked to position and spread with blades. The resulting job was one which satisfied every possible intent of the specifications.

Turner Turnpike: Outstanding Example of Asphalt Super-Highway


The 88-mile Turner Turnpike connecting Tulsa and Oklahoma City will permit motorists to traverse the 106 miles between Oklahoma's two principal cities in a conservative 110 to 115 minutes.

The Turnpike consists of two 24-ft. lanes of asphaltic concrete, separated by a 15-ft. grassed median strip. Each side has a 12-ft. paved outer shoulder, designed not as a driving lane but to provide for off-the-road vehicle emergency stoppage in any weather.

So straight is the road that only one curve as great as 1° 30' is encountered. Many safety features are included. Guard rails are placed on all fills deeper than 10 ft. The two driving lanes in each roadway are separated by a reflectORIZED stripe, and reflector delineators are spaced



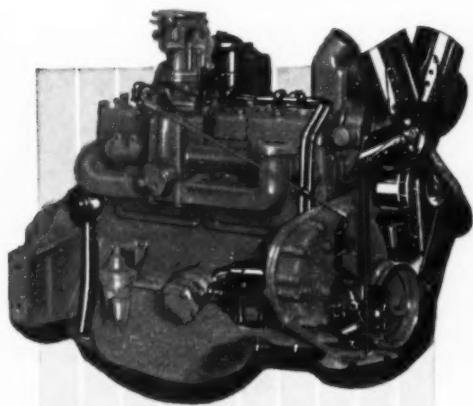
★ Tandem operation of two asphalt finishers was required, followed by immediate rolling of the center joint between laying strips. This joint was largely obliterated in the smooth-riding surface achieved



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WITH A PEDIGREE

VIEWS AND COMMENTS

By H. G. Nevitt

Are Better Binders Possible?

Comparing binders meeting state highway specifications and having wide commercial acceptance, is there any real difference in quality? That is, would different present or potential binders vary appreciably in functional ability?

These are questions frequently posed to us by men in the field. Curiously enough, this particular subject is rarely discussed among the technologists. The question is not raised nor conjectures as to the answer given. A recent A.A.P.T. paper indicates that all binders give equal stability; therefore, by selecting the proper grade, any desired figure could be obtained. Of course these results were based on one method of testing or determining stability, and admittedly this is to some extent a factor in the influence of viscosity. This paper did not receive much discussion, at least from the above standpoint. Apparently those agreeing with its conclusions saw nothing to add, while those in the opposite camp lacked data to back up their position and hence saw no reason to present their views.

We happen to be among those who do not believe that in actual use all binders do give the same results, although recognizing that satisfactory surfaces according to present day standards may be obtained from a wide variety of bituminous cementing materials. This is not the place to give the rather lengthy technical background for our belief, nor is there laboratory data clearly to confirm these views. They are based upon considerable experience in the field, with observation of jobs over a wide stretch of the North American continent. We are convinced that from the practical standpoint binders do give different results; that some materials are better adapted to this function than others; and that the strength given to the surface by the binder is not the result of viscosity alone. We believe that many practical men concur in this conclusion, with the same

background of reasons for the belief. There may be some merit to a discussion of the subject in a brief and general way.

Comparison Not Simple

Comparison of binders is affected by the technical situation. Broadly speaking they operate effectively through more than one mechanism. Hence two dissimilar binders may appear equally effective if the conditions in each case suit that binder. The mechanics of structural support from aggregate binder mixtures are complicated. Probably the present explanations or theories of the action, though far from elementary, actually represent an oversimplification. It is possible to explain the same laboratory phenomenon by more than one theory. For example, the conventional Mohr diagram (based on the Coulomb assumption) will account for the usual triaxial test results.

However, Housel has pointed out that this assumption contains some basic inconsistencies, and some other mechanism avoiding these inconsistencies, such as this arch theory, can be used to explain the findings. If there is this lack of clear understanding of a highly simplified laboratory test falling under positive (or active) lateral support, the questions concerning failure in the road under passive side support are even greater.

In practice the situation is ordinarily somewhat simpler. The binders commonly available, particularly in any specific area, generally give support from the same factors present roughly in the same proportions. Hence if one binder is superior to another it is because of superiority in some quality and this will show up in actual use if the conditions are the same and enough jobs are evaluated to average out all other influences. But the situation discussed in the preceding paragraph should be kept in mind, for the corollary to it is that certain specific good jobs with any particular binder are not evidence

that it is a satisfactory material for general use—the conditions may have been peculiarly suited to its particular properties. The converse of course also holds. In brief, to get the best results from any specific binder the requirements for good work with it must be met. At the same time merits of binders should be established on the basis of use under practical conditions of materials and equipment available, along with practicable construction requirements. Yet comparisons are frequently not made under such conditions. This accounts for the continued use of unusual construction types or materials ordinarily inferior for general use, such as road oils.

Avenues of Improvement

Evidently an improvement in binders must come from an accentuation of one or more of the characteristics which provide structural support.

For example, we know that increased consistency in the binder will (to a varying extent, depending on the aggregate) increase the measured stability value. Unfortunately it adds also to the tendency to crack and otherwise sacrifice inherent benefits of a flexible surface. Hence such accentuation of a helpful characteristic must not be accompanied by undesirable other changes. We believe such improvements are ultimately possible even though they may involve more knowledge of bitumens than is presently available.

In brief, we feel that bitumens today do vary in their functional quality and that their desirable properties will eventually be enhanced by suitable manufacture.

What are the practical conclusions to the above theoretical situation? We think there are several which are of interest to the man in the field.

The first is that he should be on the watch for definite differences in results, and try to substantiate in some practical fashion such field observations and conclusions. Of course, in

(Continued on page 93)



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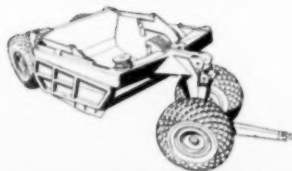
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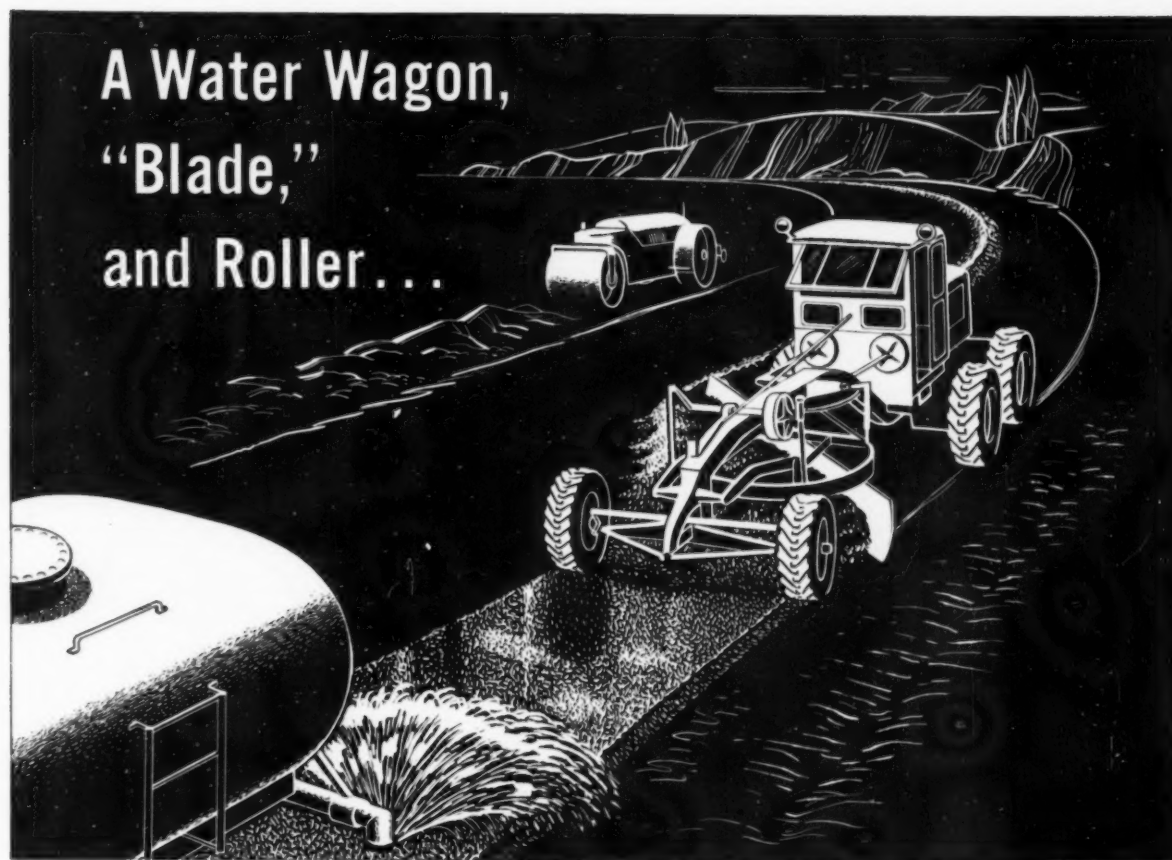


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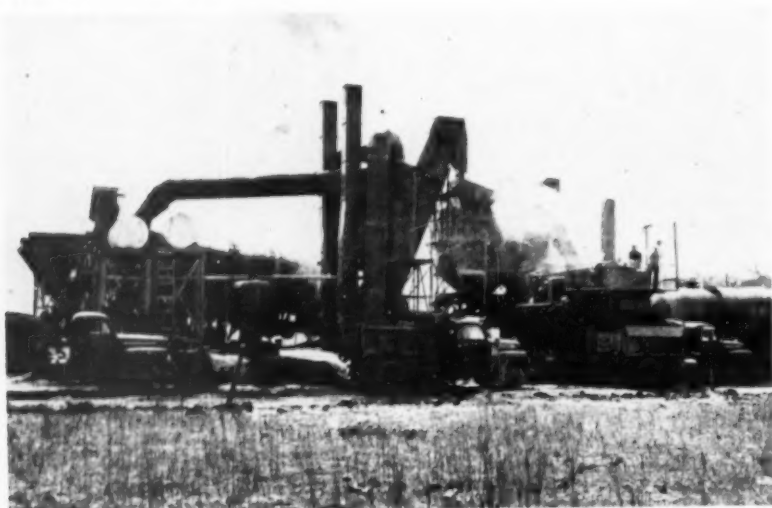
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★ Wet shoulder material being removed by a DoMor loader mounted on a Caterpillar No. 12 motor grader. This material was dried and asphalt material mixed to produce a stabilized mix for relaying



★ Hot-mix asphalt plants, a Barber-Greene Model 848, used by Dahlgren and Brooks on their 11.579 mile section of Turner Turnpike. This firm produced approximately 87,000 tons of mix, with hourly plant capacities running as high as 225 tons



★ Dahlgren and Brooks working their two finishers in tandem

Turnpike Home Stretch

(Continued from page 86)

along the center strip area between lanes and along each shoulder.

Following modern practice, a "minimum" as well as a "maximum" speed has been established for the road. These are, respectively, 40 and 70 m.p.h.

H. E. Bailey served in co-ordinating and planning and construction of the Turner Turnpike from its inception. Formerly Director of the Oklahoma State Highway Department, Mr. Bailey is General Manager of the Turnpike Authority. W. D. Hoback is Chief Engineer and Leon Shipp is Counsel General. Members of the Turnpike Authority have been J. Wylie Richardson, R. P. Mathews, Joe Jarboe, Paul Wilson and Glen R. Key who succeeded Mr. Wilson at the expiration of his term of office.

In the planning stages of the Turnpike, it was decided to permit bidding on both rigid and flexible type pavements. As a means of determining an adequate index of maintenance cost, General Manager Bailey requested maintenance cost data, involving both types of pavement, from the highway departments of 17 states. These states were carefully selected for appropriate geographical range, volume and type of traffic. Of 15 states which were able to supply data, 10 submitted a sufficiently comparative amount to permit the preparation of a report on the subject. These 10 states were California, Indiana, Kansas, Maine, Massachusetts, New Hampshire, Oregon, Pennsylvania, Rhode Island and Texas.

As a result of these figures the engineering firm of DeLeuw, Cather & Company prepared specifications for five subgrade-pavement combinations, two including portland cement concrete and three asphaltic concrete. Approved modern design formulas were employed to insure that all specifications would result in a pavement capable of standing an axle loading of 28,800 lb.

Paving contracts were awarded to the low bidder and, in each case, the low bid was on Alternate Three which consisted of 5 in. of hot mixed asphaltic concrete (2-in. and 3-in. courses) and two 3½-in. layers of stabilized aggregate base course placed on 12 in. of special subgrade material.

Legislation establishing the Turnpike Authority had limited the value of contracts for all of the major phases of the construction work. Grading contracts, let separately from paving or other construction contracts, were limited to a maximum of \$500,000 per contract. Paving and bridge construction awards were limited to \$1,000,000 each. Grading contracts, averaging 2 to 5 miles each, were awarded in a total of 26.

Contractor	No. of Contracts	Length (Miles)	Hot Mix Asphaltic Concrete (tons)	Asphalt Plant Equipment
Amis Construction Co.	2	7.975	70,000	Pioneer continuous
Anchor Construction Co.	1	4.936	40,000	Barber-Greene continuous
Dahlgren and Brooks	1	5.650	43,000	Barber-Greene continuous
Groves, S. J. & Son	2	8.613	70,000	Madsen batch
Cole, Carley Hudkins Co.	2	9.052	82,000	Cedar Rapids batch
Tecan Constr. Co.	1	7.608	63,000	Pioneer continuous
Layman & Sons	1	4.532	35,000	Barber-Greene continuous
Metropolitan Paving Co.	1	7.834	63,000	Standard batch
R. R. Ryan Constr. Co.	1	9.029	72,000	Cummer batch
Standard Paving Co.	2	5.695	47,000	Barber-Greene continuous
Steelman Constr. Co.	1	8.039	63,000	Barber-Greene continuous
H. D. Youngman	1	5.929	47,000	Barber-Greene continuous

Sixteen separate paving contracts were let (including interchanges). A tabulation of these contracts and the scope of each is included on these pages.

Two asphalt finishers, generally working in tandem, were used in conjunction with each of eleven asphalt plants, for a total of twenty-two, all Barber-Greene's.

A total of 91 contracts were awarded for all phases of the construction involving 46 prime contractors and considerably more than that many sub-contractors.

Kansas road signs set mechanical wash job

Dirty traffic signs along Kansas state highways are getting spruced up this year with the help of equipment such as is here pictured.

The "working end" of this outfit it simply a car washing attachment. Consisting of a brush on a hollow tube, it is attached to a 25-ft. length of garden hose. Warm or cold water is supplied from a trailer unit, which is nothing other than a small bituminous distributor whose burner is used to heat water.

The method was tried experimentally in the Kansas Highway Commission First division, and other maintenance divisions over the state are expected to devise similar equipment. J. Francis Barclay, highway marking engineer, originated the adaptation. Photo by Dwight Robinson.

Better binders possible?

(Continued from page 88)

doing so he must be extremely careful to show no prejudice, and to have his opinions backed up by sufficiently impartial and numerous other observers to leave no doubt that discrimination against binders which might be ruled out by such steps does not exist. We frankly do not think that there are very many binders which can be justifiably eliminated today on this basis. But as the techniques in building bituminous surfaces develop, with all the other variables controlled in better fashion and in general the quality of the work improved, it will be easier to grade and

judge the relative merits of the binders.

Ultimately this avenue of selection may have merit even though today it is not recommended except in extreme cases. Obviously it needs maximum care in application to avoid injustice of such a situation, which in the end do more harm to a construction program than the elimination of borderline materials.

Better Laboratory Control

The second step is to be more critical in his demands for laboratory procedures, which in some fashion or other measure the field results and wearing qualities of the finished surfaces under traffic.

We have commented in previous discussions that there is great question whether present laboratory methods, such as for stability, are true measures of the structural resistance of the surface. Certainly when durability, toughness, and other factors are brought in there are differences; we badly need laboratory techniques to bring these out. This is in no sense a criticism of the laboratory men. They have been struggling nobly to develop such tests. They have done a tremendous amount of work from

which we already have a great deal of valuable information.

However the desired end in this respect is still a long way off in our opinion. Everyone in the industry can make it a point to encourage further studies of this type. Also to insist that realism in evaluating tests be used to the last degree. There is no use in accepting the good intentions of laboratory theorists in lieu of practical observation, if the results from the latter tend to be more satisfactory than the former, as is the case sometimes.

Finally we can again give emphasis to the point frequently made in our discussions, that the construction of bituminous surfaces is neither a purely practical and field operation nor to be done through blind adherence to laboratory techniques and rules. It is an art requiring the maximum of scientific skill and background in its utilization; but we need to avoid, above all things, arbitrary conclusions, and the feeling that practically anything which meets the specifications is about as good as any other material which likewise does.

There are differences in binders offered today, just as there are differences in the quality of men building bituminous roads. Attention to both of these points will in the end lead us to a far higher level of performance. The roads we build today show few real failures; but we can add to the life of the surfaces and minimize their maintenance cost by persevering in attempts to further raise the quality of the material and methods used. We can progress as far from today's standards as we have from those of the past when failures were a serious threat to the future of bituminous construction.

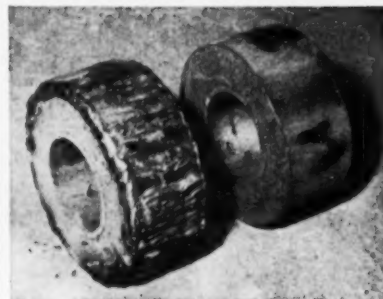
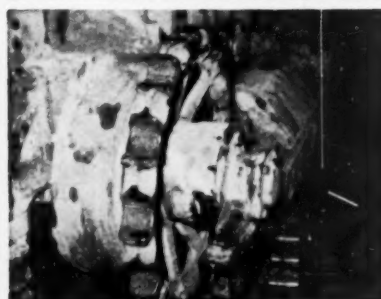
★ Converted bituminous patching distributor supplies hot water for swabbing dirty traffic signs



AT LAST! **A real build-up material that has what it takes!** **STOODY BUILD-UP**

Here's where you can
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Sprocket Teeth, Churn Drills,
Track Pads, Tractor Rollers,
Drive Sprockets, Drive Tumblers,
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USED TO BE that anything you could weld with was considered good enough for a build-up—high carbon, mild steel or what have you.

IT'S NOT SO! A real build-up material *has* to have "guts"; it has to have high tensile strength, resistance to cold flowing, rigidity, and sound deposit characteristics that will enable it to properly support the final passes of hard-facing alloys. Those properties are just exactly what you get in the new Stody Build-Up electrode.

STOODY BUILD-UP is for use on carbon and low alloy steels preliminary to hard-facing. For some uses it is recommended as a final overlay—steel shafts that require a machine finish, gears of many types, tractor rails and shovel pads. These and other typical applications are illustrated above.

See your Stody dealer or write for special folder describing

Stody Build-Up. (Consult the "yellow pages" of your phone book.)

STOODY COMPANY

11925 EAST SLAUSON AVENUE, WHITTIER, CALIFORNIA

When writing advertisers please mention **ROADS AND STREETS**, August, 1953

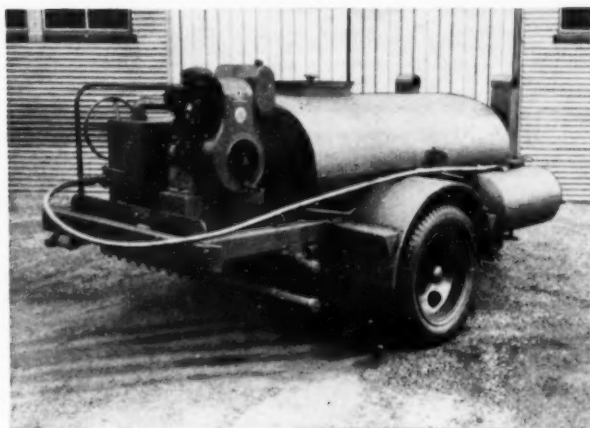
It's Etnyre "Black-Toppers" for new roads...for old roads!



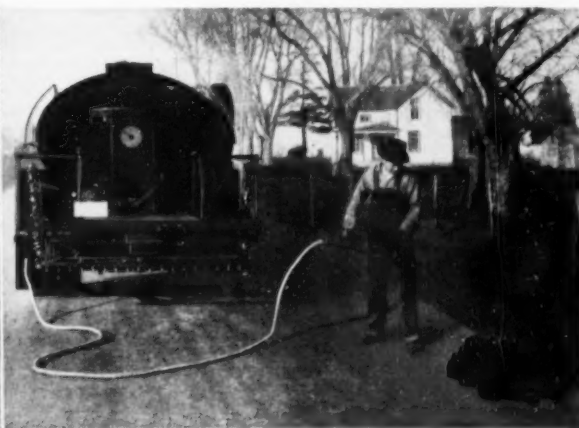
Accurate distribution, dependable performance, economical operation are features built into every Etnyre "Black-Topper." Note that straight-line edge, that complete triple-lap coverage in photograph above.



Use your "Black-Topper" to pump bituminous material through Etnyre's new Underseal Gun to stabilize concrete pavement subgrade. Get details and prices—ask about Gun No. US-1A.



Etnyre Maintenance Units are the answer to maintenance and construction work on small jobs. Completely equipped for filling, circulating, spraying, hand-spraying, and transferring. Get prices on Model "MU."



Handspraying can be handled simply and efficiently. Each "Black-Topper" comes equipped with convenient handspray controls, 25' flexible steel asphalt hose, and cold handle handspray gun.

SEE YOUR ETNYRE DEALER

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"Black-Topper"
 BITUMINOUS DISTRIBUTORS



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Current Trade Literature

Listed below are brief notes on bulletins, booklets, catalogs, brochures and circulars of particular interest to contractors and engineers. This current trade literature is yours for the asking. Just describe desired items on the Readers Service Card and mail. We will do the rest.

FORM CLAMPS AND REINFORCEMENT ACCESSORIES: Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 51, Ill. Catalog 902 (40 pages) giving full details of this company's line of form clamps, tying devices, and reinforcing bar accessories. Much useful information is given in addition to descriptions and illustrations of products, one item being a table of safe form stud and tie spacings at minimum setting temperatures.

ASPHALT PAVING PRODUCTS: Keystone Asphalt Products Co., 101 E. Ontario St., Chicago 7, Ill. 8-page catalog (illustrated) describing a variety of expansion joints, dummy joints, edge insulation, and other products.

BITUMINOUS SPRAY BAR: Fraco Manufacturing Co., Route 2, Bloomville, O. 4-page circular on full circulating, hot spray bars for any make of distributor. Diagrams show circulation system—also nozzle operation and separate control of each nozzle.

EARTH BORING MACHINE: Hydratone Corp., 681 Market St., San Francisco 5, Calif. 12-page booklet on boring for pipe installations (holes 2 in. to 14½ in.). Contains descriptions of equipment and methods, with data including diagrams showing speed and accuracy at various lengths drilled.

BUCKETS AND GRABS: The Wellman Engineering Co., Cleveland 4, O. 8-page catalog of clamshell and drag-line buckets, wood and log grabs, and stone grabs. Illustrated descriptions and detail specifications. This is the "Williams" line of equipment.

HOW TO REEVE BUCKET LINES: Erie Steel Construction Co., Erie, Pa. 4-page instruction folder showing how to reeve Erie 2-line buckets for maximum efficiency. Diagrams show reeving with 2, 3, 4, 5, and 6 parts of line. Lubrication instructions and a parts list are included.

TIRE HANDLING EQUIPMENT: The Branick Manufacturing Co., Fargo, N. Dak. 16-page catalog of air-operated tire spreaders, tire removers, service jacks, special "earth mover" jacks, curing rims, 3-way air valves, air line water traps, and other plant and garage equipment.

TIRE DATA: Michelin Tire Corp., 341 East 62nd St., New York 21, N. Y. Tabulated data on Michelin "Metalle" tires on a series of separate sheets. These tires, with steel cord casings, are especially designed for rough, heavy service.

SANITARY FILL: A very practical discussion of the "sanitary fill method" of garbage disposal is given in a 32-page brochure of Drott Manufacturing Corp., Milwaukee 8, Wis. Descriptive text with many excellent photographs of steps involved under various conditions is supplemented by letters from public works officials of cities and towns using the Drott "Bulldozer Shovel" in this service, and by a list of some 277 municipalities having one or more of these units, delivered from 1944 through 1952, for work on the fills. The communities listed range in population from 200 to 860,000. A table of operating costs and time is included.

TRAFFIC MARKERS: Armor Flex Traffic Products, 6969 Amherst, St. Louis 5, Mo. 6-page folder describing the character and manner of application of "Armor Flex." This product is available in a variety of traffic line patterns.

SCARIFIER-GRADER-RAKE: York Modern Corp., Unadilla, N. Y. A 4-page catalog describes and pictures this machine, the "Expert Workman," which was designed originally to remove over-size stones from earth and gravel roads, but which has since been developed into an all-purpose tool for the maintenance and improvement of secondary roads. The "Workman" is a pull type machine, equipped with hydraulic controls powered by its own pump and motor.

ASPHALT SMOOTHING IRON: Camm Manufacturing, 1428 First St., San Fernando, Calif. 4-page illustrated folder describing "Surfa-slick" self heating asphalt smoothing iron, and giving notes on its use.

HOW TO CLEAN CARBURETORS ON THE ENGINE: Pennsylvania Refining Co., 2686 Lisbon Road, Cleveland 1, O. 4-page instruction folder punched for ring binder. Covers both gasoline and diesel engines and is illustrated with diagrams.

MATERIAL SPREADERS: Good Roads Machinery Corp., Minerva, O. Three 4-page folders of specifications and pictures of sand, gravel, and chemical spreaders. Known as "The Jet", the three models—"King", "Queen", and "Jack"—are all of the spinner type, but differ in detail.

LADDER TYPE TRENCHER: Parsons Co., Newton, Ia. 4-page catalog describing the "Parsons Trenchmobile." The machine digs 8-in. or 12-in. trenches up to 5 ft. deep. Sloping boom undercuts sidewalks or other surface installations. Extra tire flotation is a feature that saves damage to lawns and other surfaces and provides easy road travel (12.6 m.p.h.).

EXCAVATING AND MATERIALS HANDLING MACHINERY: Osgood-General Companies, P. O. Box 515, Marion, O. 4-page bulletin (No. 5226), presenting the company's line of equipment pictorially with condensed specifications. Machines range from ½ cu. yd. to 2½ cu. yd. and from 10 to 60 tons lifting capacity. Choices of mountings and front end attachments are illustrated. Special equipment is noted.

FILTER ELEMENTS (OIL AND FUEL): Air Cleaner Service Co., 1717 S. Aloma St., Denver 9, Colo. 52-page parts list of "Cyclone" filter elements for motor vehicles, construction equipment and engines. Fully indexed by makes and models of engines, trucks, and other equipment.

AUTOMATIC WELDING EQUIPMENT: Leader Welding and Manufacturing Co., 2418 Sixth St., Berkeley 2, Calif. 16-page loose leaf catalog of hardfacing and welding units. Sheets are bound in punched covers.

HYDRAULIC HOISTS AND BODIES: Marion Metal Products Co., Marion, O. 44 pages of catalog and specification sheets are preceded by 4 pages of detailed instructions on operation, servicing and maintenance.

ROTARY SNOW PLOW: Sicaud, Inc., 2055 Bennett Ave., Montreal, Que. 16-page catalog of the "Snow Master", which loads snow directly into trucks or blows it to a distance. Beside text and many photos, there are diagrams showing details and a diagrammatic sketch of the entire machine. The discharge chute may be directed at any angle, vertical or horizontal.

TAR MOLECULES AND VALUES: Koppers Co., Inc., Pittsburgh 19, Pa. "The Extra Values in Tarmac" is the title of a 36-page booklet explaining the wetting capacity, stripping-resistance, oxidation resistance, skid resistance, and resistance to oils characteristic of "Tarmac". The story is told simply and graphically with the aid of molecular diagrams and descriptions of molecular behavior.

CURING COMPOUNDS: Serviced Products Corp., 6051 W. 65th St., Chicago 38, Ill. 6-page folder describing curing compounds for pavement, building floor, slab, or structural concrete. Four main types of compound are described—pigmented, clear, separation, and black, with several variations under each type. "Separation compound" is for tilt-up or precast construction, and provides a positive separation or bond breaking membrane.

ENGINE HEATER FOR QUICK START: Kim Hotstart Manufacturing Co., W. 917 Broadway, Spokane, Wash. 8-page, standard-punched catalog describing electric heaters for heavy trucks, tractors, passenger cars, light trucks, and power units. An explosion-proof cap for use near combustible materials is shown.

BITUMINOUS EQUIPMENT: Littleford Brothers, Inc., 454 E. Pearl St., Cincinnati, O. 36-page catalog covering a great variety of black top road maintenance and construction equipment—distributors, pumps, kettles, heaters, sprayers, sweepers, rollers, hand tools, tool boxes, and other items.

JOINT SEALING COMPOUND: The Flintkote Co., 30 Rockefeller Plaza, New York 20, N. Y. 4-page binder-punched folder on "Flintseal," hot-poured joint sealing compound for concrete pavements. Condensed directions for application are given.

ASPHALT: The Texas Co., 135 E. 24th St., New York 17, N. Y. 2-page catalog, "Road Building with Texaco Asphalt" outlines materials required and methods of construction for five types of pavement and for several types of surface treatment. Useful data tables are included.

DAGLINE BUCKET FITTINGS: Electric Steel Foundry Co., 2141 N.W. 25th Ave., Portland 10, Ore. 20-page catalog and price list No. 108J, giving specifications, diagrams, and details of bucket parts, fittings, and assemblies. This is the "Esco" line.

CATCH BASIN CLEANER: Frank D. Messenger, Agent, P. O. Box 124, Fairhaven, Mich. A single page flyer describing the "Sec-Dar" cleaner for catch basins and sumps. A part turn of the device fills the two flat bottomed, hinged scoops, which tilt back on lifting, so that a full load can be taken out, even through several feet of water.

AIR ENTRAINMENT METER: Autolene Lubricants Co., 1331 W. Evans Ave., Denver 9, Colo. 4-page bulletin on the "Protex" meter for measuring percentage of air in concrete. This is a field instrument weighing 19 lbs. An accurate test is said to be possible in 5 minutes.

WHAT'S NEW...

in Construction and Road Building Equipment, Materials and Supplies

On bound-in post card please fill in description of item on which more information is desired. The card is provided for your convenience in making inquiry and in obtaining catalogs or other data. Card works for both advertising pages and reader items.

Drop post card into outgoing mail. No stamp is required.

New Hi-Way Material Spreader

A completely new Hi-Way material spreader for one-man operation placed on the market by the Highway Equipment Co., Cedar Rapids, Ia., was designed particularly to handle pelletized calcium chloride and rock salt for road stabilization.



Model J Hi-Way Material Spreader

tion as well as dust control but works equally well with sand and chips for seal coat work, and stone up to 1½ in. in size. The feed roll which distributes the material, and is shown in the illustration, is driven from the truck drive shaft so that its speed is positively synchronized with the revolutions of the rear truck wheels, assuring a uniform density of spreading pattern regardless of the speed driven—whether forward or reverse. One simple adjustment of the size of the feed gate opening is all that is required. The Model J has an overall width of 8 ft. and achieves a uniform spread of 7 ft. 6 in. Designed to mount on any standard dump body without any alterations, the new Model J replaces the tail gate and can be easily removed.

Portable Air-Powered Circular Saw

A new portable air-powered circular saw with a maximum depth of cut of 4¾ in. has been announced by Ingersoll-Rand Co., Dept. P.T., 11 Broadway, New York 4, N. Y. The S-12 Air Saw is powered by the same dependable Multi-Vane air motor which has proven so efficient in other air tools made by this company, and is designed for use on 90 psi. air pressure. The saw blade is driven through a simple spur gear drive; the spur gear design reduces the arbor length between the motor and the saw blade. As the motor is close to the center of the saw, the weight is evenly balanced between the handles, giving a well-balanced, easily-handled saw.

New Method for Welding Reinforcing Bars

Development of a new method for joining reinforcing bars into long continuous lengths has been announced by Metal & Thermit Corporation, 100 East 42nd St., New York 17, N. Y. It has been field tested by Corbetta Construction Co. in construction of the piers on the Tappan Zee Bridge of the New York State Thruway where approximately 1,000 welds meeting the requirements of New York State Engineers were made. Briefly, the procedure consists of trimming the reinforcing bar ends with a gas cutting torch, spacing them ½ to ¾ in. apart, clamping a preformed mold around the joint, filling the mold with Thermit and igniting. Thirty seconds later the weld is completed.

Experimental Euclid Rubber Tired Bulldozer

The Euclid Road Machinery Co., Cleveland 17, O., has placed an experimental rubber tired bulldozer in operation at a power plant excavation in Southern Ohio. The unit, known as Model TPM or "prime mover," is powered by a 300 hp. engine. It is an all wheel steer, all wheel drive tractor mounted on 24:00 x 25 tires and weighing 48,000 lb. and equipped with bulldozer blade. This is one of several experimental



Euclid Experimental Rubber Tired Bulldozer

New Pipe Line Drill Rig

A new pipe line drill rig has been announced by LeRoi Co., Milwaukee 14, Wis. Equipped with adjustable boom arms the rig will be furnished with two, three or four drills, in either the heavy duty 4-in. class or the lighter 3-in. class, for mounting on any suitable crawler tractor. For



LeRoi—Cleveland SB 30 Pipeline Special

extra air LeRoi will equip the tractor with the LeRoi 600 cfm. compressor mounted on the rear and driven through the power take off. The new rig can be quickly mounted or dismounted, leaving the tractor free for other work.

designs which have been built in the past several years by Euclid and is similar to the experimental models which are being built for the Corps of Engineers for military applications. Working under extremely wet conditions, the TPM is stated to be loading various makes of scrapers in less time than usually needed for average loads and to be hauling them with larger and heavier loads than can normally be obtained under such conditions. Three 15.5 yd. Euclid scrapers on the job are said to be averaging 18.1 yd. per load.

you've got to

Swing that Rear-End

for **TOP** performance



Windrows large enough to stall the average motor grader, or cause its front end to slide sideways, are handled easily by the A-W Power Grader. Rear steer has the rear wheels *pushing* behind the toe of the blade while the powerful front drivers *pull* ahead of the heel. We call it "Controlled Traction" and it moves more of any kind of material, farther and faster than would otherwise be possible.

On job after job, right straight through the year, All-Wheel Steer simplifies and speeds things up for the operator... does more work and better work... saves time and money. No two ways about it... you've got to SWING THAT REAR-END for *top* performance.

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Construction Equipment Division

Manufactured by
AUSTIN-WESTERN COMPANY

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AURORA, ILLINOIS, U.S.A.

Mobile Laboratory for Testing Soils

A new truck-mounted mobile soils testing laboratory announced by Solltest, Inc., 4520 W. North Ave., Chicago 39, Ill., is designed for use in field testing of soils in



Interior of Mobile Soils Testing Laboratory

the design and control of construction for dams, levees, roads, airfields, pipe lines and similar structures. The laboratory is a self-contained unit, outfitted in a custom built steel van type body. Electrical power is supplied through an automatic starting electric plant; distilled water and wash water tanks are built into the laboratory body; and an air compressor and receiver are also mounted on the unit. Benches, storage cabinets and working spaces are arranged to allow three technicians to work in the laboratory.

Dump Body for Extra Heavy Duty Hauling

A new "rock" type dump body, announced by The Gallon Allsteel Body Co., Gallon, O., is designed especially to withstand the hard shock of power shovel,

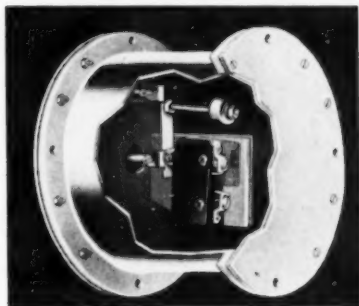


New "Rock" Type Dump Body

chute and conveyor loading. The new unit is available in from 5 to 15-yd. sizes. Body is constructed throughout of high tensile steel plate and features extra wide box type side bracing, both horizontal and vertical, on the head sheet and sides. Side braces extend up under a 4x4½ in. top roll for additional strength. According to the manufacturer, the new "rock" body design completely eliminates side bulging. "Rock" body sides fold into body floor at a 45° angle to prevent material from lodging in corners. This angle is reinforced with flat 45° steel plates at load-spaced outrigger type crossmembers. Body floor is also reinforced with a 2-in. hard wood liner inside the floor shell and wear plate.

New Model Bantam Bin-Dicator

An all-new, lower-priced model of the Bantam Bin-Dicator, bin level indicator, has been announced by The Bin-Dicator Co., 59-13946 Kercheval, Detroit 15, Mich. The small size Bantam Bin-Dicator was originally introduced to meet the demand for a unit which could be installed in hoppers, bins, chutes, etc., where installation space was too limited to permit the use of the larger, standard model Bin-Dicators. The new model is a refinement of the original model and offers even wider versatility and a lower price. Over-



New Model Bantam Bin-Dicator

all diameter of the new Bantam is 5¼ in., and the housing is so designed that it may be mounted on the outside of thin-walled bins, inside of thick walled or multiple compartment bins, or suspended within bins.

New Front End Loaders Feature New Development

(An account of Mixermobile Manufacturers' "Scoopmobile" LD5 in the June issue of Roads and Streets was wrongly illustrated. A correct picture appears below. Editor.)

Two new 4-wheel planetary drive, 4-wheel power steering front end loaders, the Scoopmobile Models LD5 and LD10, have been announced by Mixermobile Manufacturers. The LD5 capacity is ¾ to 1 cu. yd.; LD10 capacity, 1½ to 2 cu. yd. Featuring an entirely new development in smooth, flexible power, these Scoopmobiles employ a new principle of construction by hinging two power axle elements together with an oscillating center-pin steering coupling. This coupling allows an oscillating twist to the axles, retaining full power on all 4 wheels in any degree of the turning radius. Power from engine



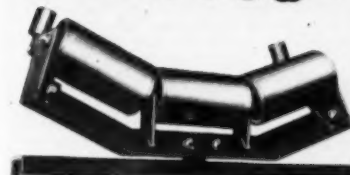
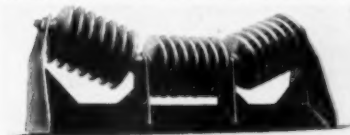
Model LD5 Scoopmobile

is transmitted to all 4 wheels through 3-to-1 planetary gearing, producing positive traction and tremendous "dig-in" power. Hydraulically operated loading bucket has exceptional "break out" action resulting in better and faster loading. Hinged coupling steering allows excellent lateral spotting of bucket. Discharge height—LD5, 8 ft. 6 in.; LD10, 9 ft. Reversing transmission has 8 speeds forward and back. Diesel power optional at extra cost.

Three New Conveyor Idlers Announced

Three new conveyor idlers have been announced by Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis, Minn., subsidiary of Poor and Co., Chicago, Ill. Each of the three rolls of the new Mesabi type Impact Idlers (see top photo) are equipped with Goodyear rubber segments 6¼ in. diameter, 1½ in. wide, mounted side by side on a 2¼-in. O.D. seamless tube. Primarily designed to absorb the shock of falling material and thus prevent undue cutting and wear of the belt, flexibility of the segments permits the belt to run smoothly over the idlers even though the material may not be evenly distributed.

Pioneer's new Mesabi self-cleaning return idlers (see center photo) are of single roll construction and equipped with Goodyear rubber roll segments. Two of the segments are mounted side by side on each



Three New Pioneer Conveyor Idlers

end of the roll. Additional segments (2, 4 or 5) are evenly spaced on the roll to permit the belt to travel freely without a build-up of material on the roller.

Two outstanding features on the new 6 in. diameter self-aligning troughing idlers (see bottom photo) are: (1) The troughing idler frame is mounted on a pivoted base, and (2) the conveyor belt rides between two guide rollers.

New Diamond 5 ft. Wide Vibrating Screens

A new model vibrating screen which has been undergoing rigid field tests for the past two years has been announced by Diamond Iron Works, Inc., 1748 N. Second St., Minneapolis 11, Minn. The new 5-ft. wide series of vibrating screens are available in 10 ft., 12 ft., and 14 ft. lengths. Adaptable for any installation, they offer a choice of 1, 2, 2½ or 3 decks. They are designed for high production while assuring freedom from work stoppage. Construction is rugged and engineered for hard usage, yet designed to insure low operating and main-



New Diamond Vibrating Screen

tenance costs. Diamond's new method of reinforcing the side plates at the shaft eliminates vibration. Heavy steel plates between the bearings double side plate strength.

New Hydro-Clam Digs Straight Down

A new addition to the line of Shawnee Manufacturing Co., Inc., 1947 N. Topeka, Topeka, Kan., the Hydro-Clam, utilizes the hydraulically powered clam bucket design to facilitate spot excavations



Shawnee Hydro-Clam

through hard frozen ground and tough black top. It is stated each half of the clam bucket can be operated independently or together; 4½ tons of pressure is applied on the bucket teeth of each half of the clam. The design is stated to permit digging of square cornered excavations 8 ft. long and 7 ft. deep. The maximum digging depth is 8½ ft. The self-leveling clam assembly raises ¼ yd. of material to a dumping height of 7½ ft. The unit operates in a 150° arc making it possible to dig from the side adjacent to buildings or other obstructions. A common feature of all Shawnee designed equipment is the ability to assemble on the tractor or remove the equipment from the tractor in less than 15 minutes. The Hydro-Clam is available with 36 in. or 24 in. clam shell type buckets.

Truck Crane Attachment Provides Sky-Hook

One or two men can work safely and quickly at otherwise inaccessible overhead jobs with an ingenious attachment on a Yale crane truck shown for the first time at the Fifth Materials Handling Exposit-



Tey Hydro Sky-Lift

tion by The Yale & Towne Manufacturing Co., Yale Materials Handling Division, Philadelphia, Pa. Basically the Tey Hydro-Sky-Lift is an articulated arm which can lift 500 lb. from the floor and hold it at any point within the upper half of a sphere 26 ft. in radius, measured from the pivot point of boom attachment. From the Yale crane truck which serves as its solid base, it can stretch to a working height 34 ft. from the ground and offer an absolutely stable platform in a complete horizontal circle. At the end of the boom are crow's nest, either one or two, each large enough for a man to work comfortably. The crow's nest is fitted with a set of controls, hydraulically operated to ensure positive and smooth action at any degree and in all directions.

New Bearing Packer Works from Original Containers

A new heavy duty bearing packer that operates in original containers, announced by The Gray Co., Inc., 1018 Sibley St., Minneapolis 13, Minn., makes the slow paddle method of transferring grease from container to separate reservoir unnecessary. Grease stays clean all the way from container to bearing. It is designed to handle all bearings from ¼ in. ID to 7½ in. OD (small end). Pressure screw tightens fast by finger pressure—holds bearing in place. Hand-operated pump instantly supplies a large volume of grease—lit-



Presto-Pak Bearing Packer

erally "pops" through to flush out dirt and provide even grease pressure throughout the bearing. Follow plate assures constant grease supply. A few quick turns of the screw and bearing is removed—properly packed and ready for work. Hinged cover can't be lost—keeps bearing receiver free of dust and dirt when not in use.

New Heavy Duty Portable Belt Conveyor

A new portable, heavy duty belt conveyor for handling loose materials has been developed by Atlas Conveyor Co., Clintonville, Wis. It is available in three



Model 125 Belt Conveyor

belt widths—18 in., 24 in., and 30 in. This Model 125 is made in lengths from 25 ft. to 60 ft. Standard equipment includes roller bearing idlers, anti-friction shaft bearings throughout, and pneumatic tired swivel wheels. Low type truck tower design means greater strength and better road clearance. The 60-ft. conveyor needs a clearance of only 13 ft. 3 in. A newly designed, sturdy, efficient, quiet operating drive shaft transmits power from the power units, through two enclosed gear cases, to the conveyor belt pulley at the head end.

Dump Trailer Packages Increase Legal Payloads

Two new telescopic hoist dump trailer units specially engineered to increase legal payloads and improve dumping performance are now in production at Hercules Steel Products Corporation, Gallon, O. The



New Telescopic Hoist Dump Trailer

two units, available as standard packages, are a 17-ft., single axle trailer with 10 to 17 cu. yd. capacity, and a 20-ft., tandem axle unit with a capacity range from 12 to 26 cu. yd. Highlights of the new design are the extreme front mounting of the three and four sleeve twin telescopic hoisting mechanisms and the simplified method of packing the telescopic joints, the latter resulting in reduced maintenance costs.

Hydraulic Cutter Cuts 3½ In. Cable

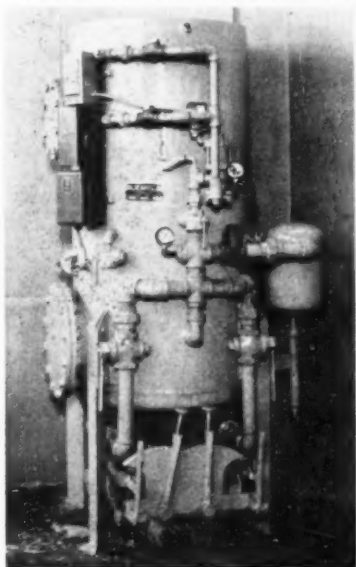
A cable cutter with a handle pull so easy a small boy could operate it and with a capacity up to 3½ in. lead sheathed and power cable (except submarine cable) up to 3,000 mcm. has been announced by H. K. Porter, Inc. It is hydraulic, rests solidly on floor or flat surface (may be bolted down). The long swivel type handle eliminates stooping and may be operated at any angle. Required only 7 handle strokes per in. This new unit is all cutter with no excess weight or bulk, nevertheless the construction is rugged to handle the full power of the 10,000 lb. hydraulic jack. This jack is self-retracting and may be stopped at any desired cutting opening by means of release valve. Cutting edge is protected by brass insert in anvil. Weight of complete cutter is 30 lb.



Hydraulic Cable Cutter

Blasting Generator for Cleaning Large Areas

A new double compartment continuous blasting generator, announced by Ruemelin Manufacturing Co., 3860 N. Palmer St., Milwaukee 12, Wis., has been developed to fill the need of contractors who have to clean large areas prior to painting such as steel bridges, gasoline and oil storage tanks, river barges and similar large scale operations where continuous



Ruemelin Double Compartment Blasting Generator

operation of one or two nozzles is of importance to rapid work. This generator is a double compartment, continuously operating type, with all valves electrically controlled, which permits the upper chamber to be loaded with sand while the lower compartment is operating under pressure. When the lower compartment is about two-thirds empty, the valves trip automatically so that contents of the upper compartment are also under pressure. When lower compartment is filled, the valves go back to their normal condition so that upper compartment can be filled with sand by means of a sand elevator or clam shell bucket.

Cargo Truck Has 30 Ft. Deck, 17 Ft. Wheelbase

A new heavy duty cargo truck, now in production by Murty Brothers, has a steel deck and is designed for carrying structural steel, pipe, lumber, and other long bulky cargo. The Murty flat-top is made



Murty Flat Top Dual Axle Cargo Truck

with both single-axle and dual-axle drive. The single-axle type has a 25-ft. deck length with a turning wheelbase of only 14 ft. 11 in. The dual truck has a 30 ft. deck and a 17-ft. wheelbase. Pay loads are 10 tons for the single-axle and 15 tons for the dual-axle.



Compact truck unit used by Ohio Highway Dept., Div. of Maintenance, containing compressor, pump and drums of Presstite No. 77.

More state highway departments are swinging to **Cold Applied PRESSTITE No. 77** Paving Joint Sealer

In search for a paving joint sealer that would provide longer lasting, more satisfactory service as well as easier application, Ohio conducted experimental tests in 1951 and 1952 using Presstite No. 77 sealing compound.

After thorough study of the highway test sections, the State of Ohio Department of Highways adopted Presstite No. 77 cold applied paving joint sealer for concrete and bituminous paving (Specification No. M-110.26).

Here is an ideal paving joint sealer for new pavements and maintenance re-sealing that remains flexible, resilient and adhesive, withstands repeated expansion and contraction of the pavement, and forms an impervious barrier against passage of water through the joints and into the sub-grade below.

Presstite No. 77 is quick, easy and economical to apply . . . maintains its toughness and elasticity under extremes of temperature and heavy traffic.

Excellent condition today of concrete joint on Ohio highway sealed October, 1951.



Easy, rapid application with hose and nozzle.



WRITE TODAY for new catalog and full details on cold applied paving joint sealers.

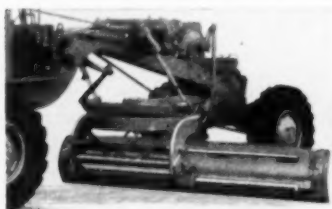
PRESSTITE ENGINEERING COMPANY

3782 Chouteau St., St. Louis 10, Missouri

Adams Motor Graders Have Power-Shiftable Moldboard

Adams motor graders are now available with power-shiftable moldboard according to an announcement by J. D. Adams Manufacturing Co., Indianapolis, Ind. This shift is made by hydraulic power through a convenient control in the operator's cab. A shift of 26 1/2 in. to either right or left of center position can be made in a matter of 10 seconds. This feature enables the grader operator, with very little effort and time, to get extreme blade positions for cutting high banks, cutting low, flat back-slopes, and to get wide reaches outside the line of wheels for shoulder finishing, casting material over embankments, etc. Quick shift of the blade outward and inward also permits the grader operator

on surface work to dodge culvert heads, posts, grade stakes, etc. without altering the angle or plane of the blade or changing the direction of grader travel.



Adams Motor Grader with Power-Shiftable Mold Board



TEAM UP THIS STANDARD STEEL S-J WITH A STANDARD STEEL TAR KETTLE FOR LOW COST/ROAD MAINTENANCE!



STANDARD STEEL TAR KETTLES

✓ You get three separate operations from Standard Steel Tar Kettles. (1) Hand operated spray assembly; (2) Motor operated, and (3) Gravity Draw off for bucket work. Uniform heat throughout mass of material eliminates "cold spots" or "burnt materials." Team up an "S-J" and a Standard Steel Tar Kettle and you can handle any repair work or secondary construction at less cost—less work—with less investment in equipment. Write for Catalog "TK".

STANDARD STEEL "S-J" for SECONDARY CONSTRUCTION

✓ Whether used for construction of playgrounds, driveways, parking areas, or for patching, sealing, shoulder repair or crack filling, Standard Steel "S-J" works fast—economically—efficiently.

SAVES WORK—a special "SUCK BACK" element cleans spray bar instantly after shutting off flow of material.

NO DELAYS STARTING—pump and entire piping system is instantly drained after completing a job—eliminating freezing and loss of time on starting next job.

SAFETY—Gravity Draw off on curb side protects operator.

Write for Catalog "S-J" for Further Details

OTHER PRODUCTS

Asphalt Pressure Distributors, Patch Rollers, Supply Tanks, Tool Heaters, Asphalt Tools, Street Flushers, Construction Brooms and Aggregate Spreaders.

SJ6

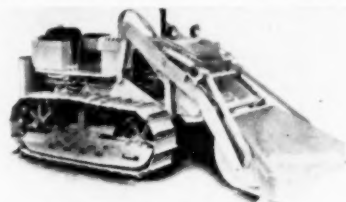


Standard Steel Works NORTH KANSAS CITY, MO

Digging-Loader in Lower Price Range

(An account of American Tractor Corporation's "Terraload'r" in the June issue of *Roads and Streets* was wrongly illustrated. A correct picture appears below. Editor.)

A versatile new digging loader, known as the Terraload'r, announced by American Tractor Corporation, is stated to have many features not usually found in industrial equipment in the lower price range. The Terraload'r can be used to load trucks and railroad gondolas. It digs trenches and grades as a bulldozer, and can carry loads from the site of one activity to another. A powerful hydraulic lift and control valve permits a float position for the efficient handling of loose materials when dozing or loading. The close forward mounting allows unrestricted access to tractor seat and controls. Excellent operator visibility has been combined with full excavating width, ample dumping height and reach. It is claimed that the Terraload'r can doze



American Tractor Terraload'r

efficiently without "roll under." The machine is available in three models: GT-30, GT-34, and DT-34. The first model has a drawbar horse power of 26.3, and is equipped with a 1/2 yd. bucket. The GT-34 has a drawbar power of 30 and the DT-34 (diesel), 29. The latter two models are equipped with a 3/4 yd. bucket.

Dispenser Fills All Types of Grease Guns

A new dispenser designed to fill all types of grease guns has been introduced by K-P Manufacturing Co. Called the GFD-100, the dispenser handles any grease gun equipped with a filler plug or that requires removal of the gun head for filling. The dual dispenser fills either through a filler valve



GFD-100 Grease Dispenser

fitting in the head of the gun, or through a filler plug on the side of the dispenser. The filler valve fitting permits filling the gun by a few easy strokes of the gun handle. Where the gun head is not tapped for a filler plug, it is only necessary to remove the gun head, attach it to the filler plug on the side of the dispenser, and fill the gun with a few strokes of the handle.

*For Better
BITUMINOUS
SURFACING-*

USE
**GALION
TANDEM
ROLLERS**



FEATURES

- Rugged spur gear drive.
- Dual operating controls.
- Hydraulic steering.
- Variable weight.
- Highest compaction efficiency.
- Large capacity sprinkler system.
- Complete accessibility of engine compartment and housing.
- Powerful, economical gasoline or diesel engine.

Write for literature.

The "FINISHING TOUCH" on Compaction Jobs!

Galion Tandem Rollers give you two important advantages which are necessary in building durable black top roads and street surfaces — dense compaction and smooth finish.

In addition, powerful engines, compact design, easy and comfortable operation are features that make GALION Tandems "solid" with operators.

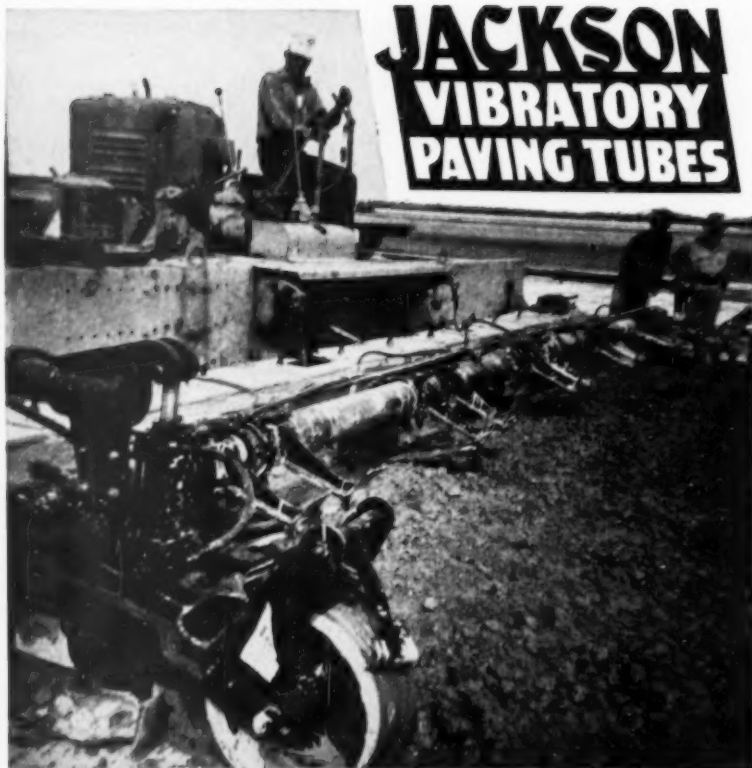


MOTOR GRADERS · ROLLERS



THE GALION IRON WORKS & MFG. CO., General and Export Offices, Galion, Ohio, U.S.A.

Cable address: GALIONIRON, Galion, Ohio



Now SUPER-POWERED More FLEXIBLE FOR THOROUGH INTERNAL VIBRATION OF ALL SLABS 6" TO 24" THICK - UP TO 25' WIDE!

Now supplied with far more powerful motors, as many as five to the 25' width, there is no job of concrete HIGHWAY OR AIRPORT PAVING too tough for the JACKSON VIBRATORY PAVING TUBE! Extremely flexible, it may be had with just the number of motors needed and vibratory frequency variable to suit concrete mix. Easily attached to standard finisher or spreader, its use assures:

1. Maximum compressive strength and impermeability of the hardened concrete through use of dryer, more economical mixes.
2. Faster finisher progress in normal highway paving.
3. Complete and uniform compaction throughout the mass, with no mortar streaks — even on 25' airport slabs. (It is equally efficient where air-entraining cement is used).
4. Adequate puddling at sideforms on the average paving job.
5. Excellent finish without excessive mortar.
6. Reduction in spreading cost wherever a spreader is not used . . . the powerful vibratory action and plasticity achieved, smooths out the major humps and hollows.



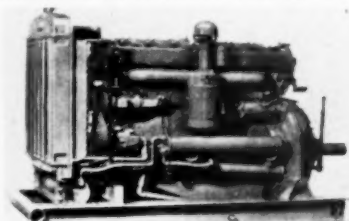
For better results, as well as time-and-money savings to be achieved on any major concrete paving job, get the complete facts concerning the Jackson Vibratory Paving Tube. See your Jackson Distributor or write to us.

JACKSON VIBRATORS, INC.

LUDINGTON, MICHIGAN

Murphy Diesel Adds 4 New Models

The power range of the diesel engines of Murphy Diesel Co., 5317 W. Burnham St., Milwaukee 14, Wis., has been extended upward with the addition of four new models having a bore of 6½ in. and a stroke of 6½ in. The new Model 24 is rated at 185 hp. continuous, 200 hp., intermittent; the Model 124 at 210 hp., continuous, 225 hp. intermittent; the Model 224 at 200 hp., continuous, 215 hp., intermittent; the Model 324 at 225 hp., con-



New Murphy Diesel Engine

tinuous, 240 hp., intermittent. Models 24 and 124 are designed to operate at 1,200 rpm. continuously; Models 224 and 324 at 1,400 rpm. continuously. The addition of these four models brings to 25 the number offered by Murphy Diesel. They range in output from 90 to 240 hp.

Sweeper, Light in Weight, Easy to Handle

A new 3-wheel engine-driven sweeper has been brought out by Little Giant Products, Inc., Peoria, Ill. It sweeps at any angle up to 30° to left or right of center. The 7-ft. broom cleans a swath 6 ft. wide; 8-ft. broom cleans a swath 7 ft. wide. The broom is driven by a Wisconsin air-cooled engine developing 15 hp. at 1,600 rpm. Hy-



Hy-Port Sweeper

draulic controls at operator's platform regulate up and down movement of the broom. Simple manual controls change the sweeping angle of the broom and regulate the broom for wear.

New Trailer Has Low Climb Angle

A new low platform Tilt-Top with an 8 degree climb angle has been added to the line of construction equipment trailers of Miller Research Engineers, 412 S. 92nd St., Milwaukee 14, Wis. This new low platform model (4-ton capacity) embodies the same rugged structural features used in all Miller Tilt-Tops. These include an all steel electrically welded frame with tapered side channels—for maximum capacity without needless weight and a straight-through H

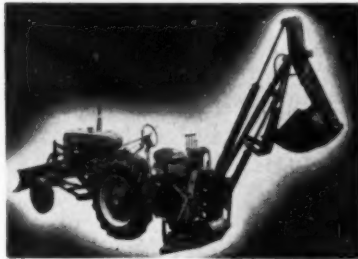


Model D Tilt-Top Trailer

beam axle. Standard 8 ft. x 14 ft. platform is planked with 2-in. oak. The platform is approximately 22 in. from ground level and has 72 in. clearance between tires to provide maximum usable space.

New Models Henry Backhoe Have Many Improvements

New models B-8-3 and BA-8-3 of its hydraulic backhoe, announced by Henry Mfg. Co., 1700 North Clay St., Topeka, Kan., have been reinforced at all points of stress throughout with double strength material now being used in the pedestal and boom assemblies. The dipper stick is now complete box channel construction, for greater strength and elimination of twists. The mainframe has been redesigned for additional rigidity and is also



1953 Model Henry Hydraulic Backhoe

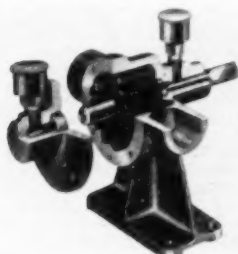
complete box channel construction. Hose guards have been added to the pedestal to eliminate hose damage. Of special interest to backhoe users, is the adjustable stabilizer in the new 1953 Henry hydraulic backhoe models, which keeps the pedestal and mainframe in the correct perpendicular position regardless of terrain.

Pressure Charger Cuts Lubrication Time

An air-operated, automatic "pressure charger," to be used in conjunction with piped high pressure lubrication systems to gain peak efficiency and cut lubrication time, has been announced by the Alemitte Division of Stewart-Warner Corporation, 1826 Diversey Pkwy., Chicago 14, Ill. Installed in the line near the delivery hose, the device is designed to provide rapid servicing of all high pressure lubrication points, under the most severe conditions. It is stated to overcome any problems that may develop from long pipe lines, low temperatures or "tough" lubricants. In operation, it will provide instantly 6,000 lb. of lubricant pressure at the control valve, when used with 125 lb. or more of air pressure.

Pump Has New Impeller Design

A new general purpose pump, announced by Hypro Engineering, Inc., has an entirely new impeller design, claimed to improve priming qualities and increase pump output. The new impeller, molded in a tough, durable rubber, has 12 vanes which



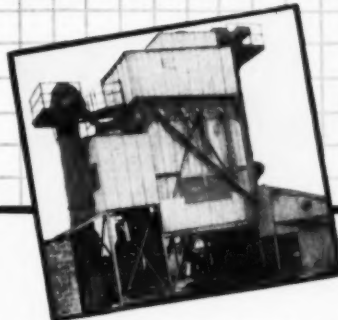
New Hypro General Purpose Pump

result in greater displacement and greatly improve pump priming. Sharp lateral wiping edges on each vane minimize friction by reducing impeller drag, produce less unit wear and improve mechanical efficiency of the pump up to 15 per cent. Another advantage claimed for the multi-vane impeller is the even, continuous flow of liquid. The pump is available in three models— $\frac{1}{2}$ in., $\frac{3}{4}$ in. and 1 in. port sizes.

Not "stocked" for Tom, Dick and Harry

But

ENGINEERED FOR YOU



SAVE MONEY with
IROQUOIS

COMPLETE ASPHALT PLANTS

Stock assemblies often prove to be expensive misfits when used for asphalt preparation. An Iroquois Complete Asphalt Plant engineered—from feed to discharge—for your location . . . your type of mixing . . . your capacity requirement . . . costs you no more than a stock assembly. In addition, Iroquois' more efficient plant arrangement . . . Iroquois' improved equipment design . . . effect savings in labor and operating costs.

SEND FOR FREE BULLETINS

Iroquois Asphalt Plants

Bulletin No. 405

Iroquois Twin Shaft Pug Mill Mixers

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Iroquois Dryers

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*Iroquois Division**

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**Established over 60 Years*

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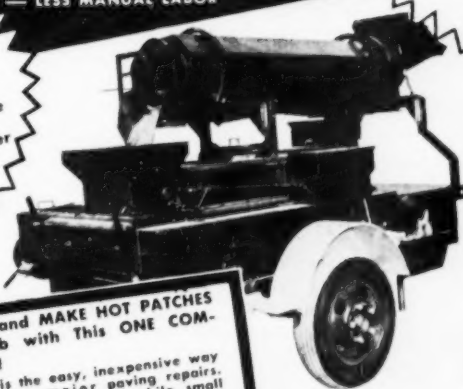
NOW The ONLY Complete
MOBILE ASPHALT REPAIR UNIT

PATCHMOBILE

FEATURES GREATER CAPACITY
— LESS MANUAL LABOR

GREATER
CAPACITY!

165-Gal. Kettle
7' Rotary Dryer
34" Pugmill



Model PM-215

HEAT, MIX and MAKE HOT PATCHES
On the Job with This ONE COMPLETE UNIT!

Patchmobile is the easy, inexpensive way to save costly major paving repairs. Patchmobile is a complete mobile small asphalt plant in one compact unit, ready at all times to provide hot mix. Dries aggregate, heats bitumen and produces an accurately proportioned mixture. It's the only unit that requires no manual contact with the material from charging hopper to paving surface. Volumetric measuring system charges hot asphalt directly into pugmill. Equipped with asphalt pump and hand spray attachment. Also available with 2-compartment kettle (55-gal. and 110-gal.) Find out about the new Patchmobile today!

NO
Manual Handling
Of Aggregate
And Asphalt
From Charging Hopper
To Discharge Chute

MAIL FOR COMPLETE DETAILS, NOW!

Please send FREE complete details on the new model PM-215 PATCHMOBILE.

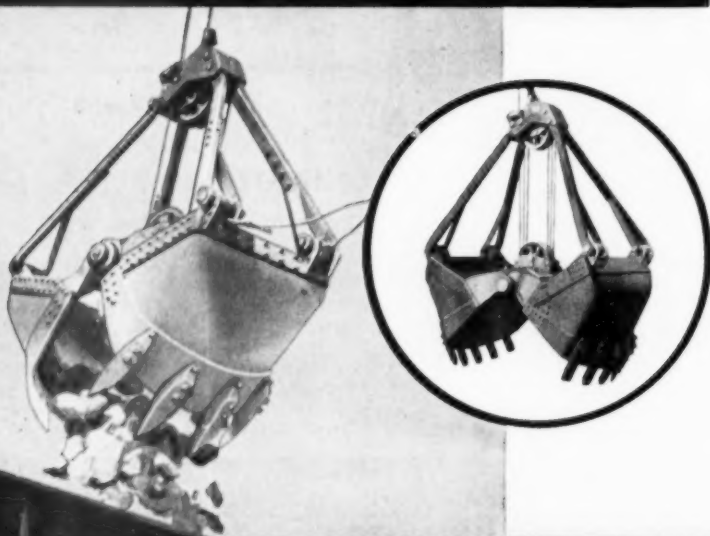
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Wylie Mfg. Co., Bx 7086 (Zone 12) Okla. City

Choose the **OWEN** **ROUND NOSE**



for Rigorous Requirements

If you've had occasion to use a round-nose hand shovel you'll understand why—

An Owen Round-Nose Bucket is uncommonly efficient in handling rock and broken slag and in exceptionally hard excavating and dredging operations.

As compared to a straight-nose shovel, the round-nose penetrates hard earth more readily—"noses" its way into broken rock with less effort—and consistently comes up with a "bigger load." And like an egg it is stronger due to its curved surface.

In the Owen line is a bucket for every specialized and general digging and rehandling purpose.



*A mouthful
at every bite*

**BUCKETS
AND
GRAPPLES**
Write for Catalog

THE OWEN BUCKET CO.

6070 Breakwater Avenue • Cleveland, Ohio

Branches: New York, Philadelphia, Chicago, Berkeley, Calif., Fort Lauderdale, Fla.

Manufacturers' Literature

Your request on our post card insert (no stamp required) will bring you any of the publications here listed. Should you want other information, we will endeavor to get it for you.—Roads and Streets.

New Brochure on Anti-Stripping Additive

A new 12-page brochure outlining the problem of bond and stripping in bituminous paving and a method of combating it with Nostrip additive has just been published by Maguire Industries, Inc., 182-27 Liberty Ave., Jamaica 33, N. Y. A full exposition of procedures in using Nostrip to strengthen the bond and protect against moisture in both hot and cold laid plant mixtures and in road application, is accompanied by tables showing Nostrip's effectiveness with various types of aggregate. Data in these tables were reported by the U. S. Public Roads Administration or were compiled under USFRA recommended testing procedures.

Safety Precautions in Use of Hose

A new safety booklet, "Dangers Under Pressure," is being distributed by Hose Accessories Co., 2700 No. 17th St., Philadelphia 32, Pa. It was prepared solely for the benefit of all hose users to aid them in securing long trouble-free service life of both hose and hose couplings. And, above all to help avoid serious or fatal accidents. Unless care is employed in the proper selection and application of hose couplings, the danger to life and property is tremendous. Improper attaching of couplings to hose or mis-application are frequent causes of serious accidents or costly delays and interruptions.

Extra Heavy Duty Apron Feeders

A new illustrated 4-page bulletin (No. U536) on its extra heavy 9-in. pitch apron feeders has been issued by Universal Engineering Co., 625 C Ave., N. W., Cedar Rapids, Ia., a subsidiary of Pettibone Mulliken Corp., Chicago. Designed for heavy duty applications in mines, quarries, and allied industries, this new apron feeder is stated to offer outstanding features for longer life, smoother operation, and easier maintenance. The feeder is available in 36 in., 42 in., 48 in., and 60 in. widths. Manganese flights are optional. Complete specifications, dimensions, and construction details are given in the bulletin.

Tunnel Equipment for Small Jobs

Selecting equipment for driving the small tunnel demands considerable more thought than for larger tunnels. These tunnels are so small that only a few men can work in them; therefore they must be given the correct equipment of the correct size so that they can work most efficiently. Equipment for the small tunnel is covered in a bulletin issued by Mayo Tunnel and Mine Equipment, Lancaster, Pa. Included in the bulletin are illustrations and descriptions of air locks, car passers, drill jumbo, muck car, small mucking machine, side dump car, etc.

Horizontal and Vertical Drills

Detailed information on Cardox-Hardsocg horizontal and vertical drills is given in a 6-page circular issued by Cardox Corporation. Illustrated and described are the standard hydraulic horizontal drill, the standard vertical drill, the heavy duty vertical drill, the self-propelled hydraulic horizontal drill and the tractor mounted vertical drill.



It's Paved with **Komac**^{*} the Year-Round patching and paving premix

Tarmac[®]

For Road Building or Resurfacing

TARMAC resists the stripping action of water . . . even withstands the softening effect of gasoline and oil drippings.

You can speed up construction work with **TARMAC** because it penetrates quickly, cuts through dust or moisture films readily, mixes easily with local aggregates and adheres firmly.

KOPPERS COMPANY, INC.

Tar Products Division

Dept. 832T, Pittsburgh 19, Pennsylvania

• Easy-to-apply **KOMAC** premix is the answer to your patching and resurfacing problems. Regardless of the weather—rain or shine, hot or cold—you just sweep out the hole and fill it with **KOMAC** premix. Compact it thoroughly, then open the road immediately to heavy-duty, continuous traffic.

One of the distinct advantages to remember about **KOMAC** is that it may be stored for a year or more without losing its easy workability. And it *pays* to stockpile **KOMAC**; as you know, road surfacing materials aren't always available in emergencies. But when you've got **KOMAC** on hand, you just shovel it into trucks and you're ready to go. It won't stick to shovels, truck beds, or spreading equipment.

Investigate **KOMAC** premix. Get your supply of it before the cold weather sets in, and you'll have it *when* you need it. For complete information, write today for our free booklet.

*Koppers Trademark

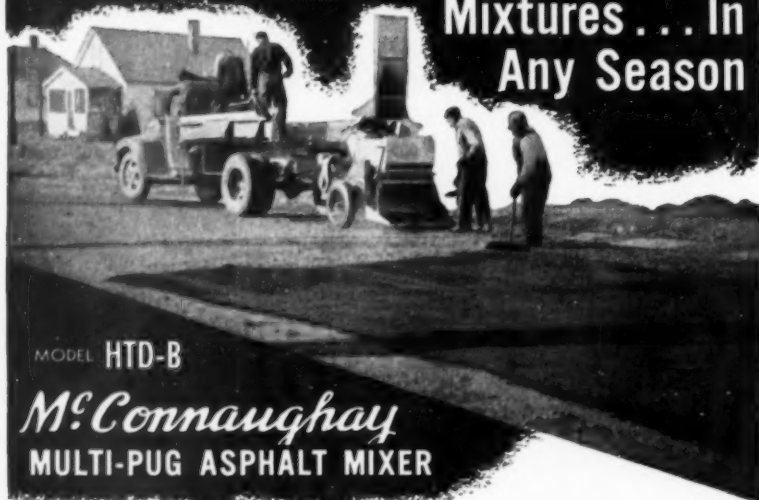


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107

For Hot or Cold Patching Mixtures... In Any Season



MODEL HTD-B

McConnaughay
MULTI-PUG ASPHALT MIXER

Here's exactly what you need for quick, economical pavement repairs and small surfacing jobs... in any season... under wet or dry conditions. It's the McConnaughay HTD-B Mixer, precisely engineered and rigidly constructed to handle on-the-job mixtures of asphaltic concrete, sheet asphalt, sand asphalt or mastic asphalt... hot or cold... at remarkably high rates. It will enable you to meet all conditions with least effort and at lowest possible costs the year 'round. Write, wire or 'phone today for details and specifications.

No Other Machine Can Do ALL These Things!

Reactivate and heat stock pile mixture—up to 10 tons per hour.

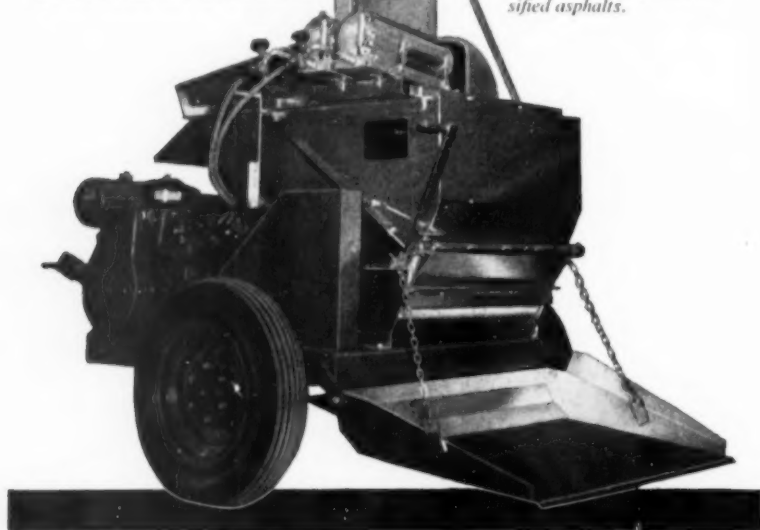
Prepare cold asphaltic mixtures—up to 10 tons per hour.

Prepare hot asphaltic mixtures—up to 5 tons per hour.

Dry various types of wet aggregates quickly, thoroughly.

Remove both moisture and solvents from bituminous mixtures.

Produce bituminous mixtures with tars, paving asphalts, cut-back asphalts, and emulsified asphalts.



K. E. McCONNAUGHAY

LAFAYETTE 2, INDIANA

Flexible Metal Hose Catalog Contains Engineering Data

A comprehensive and informative catalog on metal hose has been published by Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J. Titeflex helically-wound flexible metal hose and Uniflex helically-corrugated flexible metal hose are illustrated and described in Catalogue No. 200. Complete descriptions and specifications for flexible metal hose, fittings and assemblies are given. Featured in the Engineering Data section are charts showing frictional losses versus flow rates for various sizes of metal hose and conduit. These flow charts are believed to be the first ever offered in a metal hose catalog and can be used as a standard for flexible metal hose of various types. The Engineering Data section also contains complete information on installation and maintenance of metal hose.

Paving Breakers, Tools and Accessories

A new 8-page bulletin (Form 4127) issued by Ingersoll-Rand Co., Department RD, 11 Broadway, New York 4, N. Y., tells, concisely, the story of Ingersoll-Rand's series of breakers from the 14 lb. J-10 to the 146 lb. R-30. Each machine is adequately described both as to specifications and jobs it can perform. A typical cross-section view shows all the important features of the construction and design of the paving breaker line. Two pages of the bulletin illustrate the individual tools and accessories available for the complete line.

Equipment for Materials Handling

Methods in materials handling that reduce operating costs for industry are pictorially described in the new 12-page "Modern Materials Handling" market brochure by the Tractor Division of the Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Illustrating the brochure are action shots of crawler and industrial wheel tractors, motor graders, and power units, plus detail views of the rubber-tired earth moving equipment recently added to the A-C line.

Nine Models of Ditchers Described

A new catalog covering all 9 models of Buckeye ditchers has been announced by Gar Wood Industries, Inc., Consumer Service Dept., Wayne, Mich. The catalog, well illustrated with action and still photographs, shows the many types and sizes of Buckeye ditchers available, their digging speeds, digging depths, widths, etc. Also included in the catalog are data on engines, horsepower, machines weights, and ground bearing pressures.

Technical Booklet on Use of Vinsol

A new technical booklet giving up-to-date information about the use of Vinsol, a low-cost dark-colored resin, in a variety of applications is available from Hercules Powder Co., Wilmington, Del. Applications for Vinsol discussed include its use in asphalt emulsions, hydraulic cement, adhesives, electrical insulation, ink, shoes, floor coverings, paper, plastics, and protective coatings.

Aluminum Poles for Street Lighting

A new 2-color booklet describing G-E's aluminum pole street lighting is available from General Electric Co., Schenectady 5, N. Y. The well illustrated 12-page bulletin, GEC-695B, describes the application, construction features, specifications, modifications, and accessories for the various types of poles available.

Technical Data Manual on Industrial Belting

A new, "simple-to-understand" 48-page technical manual on transmission, conveyor and elevator beltings is being offered by the Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass. Each of the three major divisions of the manual contains a general information section comprehensively covering every aspect of each belting. General information data is handled in question-and-answer style in simple, lay language, making it a valuable reference work for the non-engineering group.

Telescopic Hoist Dump Trailer Packages

In informative new catalog sheet illustrates and describes two new Hercules front-mount twin telescopic dump trailer packages now in production at Hercules Steel Products Corporation, Gallon, O. The two standard packages, one a 17 ft., 17 cu. yd. single axle unit, and the other a 20 ft., 20 cu. yd. tandem axle unit, incorporate a new hoist design and lifting position which is fully illustrated and explained.

Heavy-duty High-Speed Vibrating Screens

Complete information on Delster heavy-duty Types ETP (end tension, pillow-block) and ETU (end tension untitled) high-speed vibrating screens is given in a new bulletin No. 35 released by Delster Machine Co., 1933 East Wayne St., Fort Wayne 4, Ind. Specific operational features of the ETP and ETU are described, listing performance characteristics which are of advantage to the user.

New Uniform Sign Chart for Highways

A new comprehensive uniform sign chart for highways, published by U. S. Porcelain Enamel Co., 4635 E. 52nd Drive, Los Angeles 22, Calif., contains a complete listing of all authorized signs recognized by the Division of Highways of the State of California, as well as signs conforming to the regulations of other states, national and many municipalities.

Diesel Wheel-type Tractor

"The high production cat DW10" is the title of an 8-page booklet, (Form 30664) published by Caterpillar Tractor Co., Peoria 8, Ill. The pamphlet points out the many types of jobs on which the DW10 rubber-tired tractor can be operated. Using 12 photographs for illustration, it shows the DW10 at work hauling scrapers, wagons, and a sprinkler and also shows it being used with a bulldozer attachment.

Hydraulic Jacks and Pullers

A new general catalog has been issued on its line of mechanical and hydraulic jacks, hydraulic pullers and special purpose jacks by Templeton, Kenly and Co. The catalog contains 34 pages of application pictures and information, detail drawings, specifications, plus a full listing and illustration of all accessories and attachments that are available.

Standardized Hangars for Civil and Military Aircraft

"Standardized Hangars by Luria" is the title of a new illustrated catalog on structures for civil and military aircraft, published by Luria Engineering Co. The catalog contains descriptions, photographs, cross-sectional drawings and specifications of various types of standardized hangars, lean-to's and clear-span service buildings. Advantages claimed are the lower costs made possible by the company's mass-production methods, the speed of erection, the permanence of steel-frame design and the adaptability of the structures to special requirements.



AIR FIELD ASPHALT PAVEMENTS — LAST LONGER WHEN SEALED WITH J-16 BECAUSE:

- J-16 protects such pavements from damage caused by gasoline, hydro-oil, jet fuel, etc.
- J-16 protects such pavements from the oxidizing and volatilizing action of the sun.
- J-16 stops water seepage which causes softening or failure of base.
- J-16 provides a durable attractive satin black, easy-to-clean wearing surface.
- J-16 is applied without the use of aggregate cover, which when loose causes so much damage to props and turbines.

Protective maintenance pays



For complete details on Jennite J-16—Write for Specifications and these two brochures.



MAINTENANCE INC.

WOOSTER, OHIO

CABLE ADDRESS: MINCO



**"IT'S THE GREASE
FOR TOUGH
OPERATIONS"**

says McCULLOCH MOTORS CORP.
Makers of the famous McCulloch Chain Saws

"We tested all types and makes of lubricants for the Zerol gears in the transmission. The one grease selected for long, tough operation was LUBRIPLATE. Now that we have produced thousands of McCulloch Chain Saws, we more than ever recommend the use of LUBRIPLATE Lubricants in our tools."

For nearest LUBRIPLATE distributor, see Classified Telephone Directory. Send for free 56-page "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

**REGARDLESS OF THE SIZE
AND TYPE OF YOUR MACHIN-
ERY, LUBRIPLATE
LUBRICANTS WILL IMPROVE
ITS OPERATION AND REDUCE
MAINTENANCE COSTS.**



Hard-Facing Electrodes and Rods

Alloy Rods Company, York, Pa., has issued a new 12-page catalog (Bulletin AR53-20) on its line of "Wear-Arc" hard-facing electrodes and "Wear-Flame" hard-facing rods, offered in nine and four basic types, respectively. Intended for fast, efficient, and economical rebuilding and hard-facing for correction of wear patterns, these electrodes and rods have applications in: straight abrasion, abrasion and severe impact, abrasion and light impact, abrasion and compression, abrasion and corrosion, abrasion and heat; abrasion, heat and impact; and abrasion, heat and corrosion. Catalog is written from the "how to do it" standpoint, and three pages are devoted to an "Application Guide" citing wear parts, types of wear, and the correct electrode or rod to use in 13 major industrial applications, on about 75 common types of hard-facing.

Cold Applied Paving Joint Sealers

Presstite Engineering Company, 3786 Chouteau Ave., St. Louis 10, Mo., has just published a comprehensive new catalog on its line of cold applied paving joint sealers for use on concrete and bituminous highways, streets, bridge decks, canal linings, airport aprons and runways, and other heavy construction projects.

Covered in the catalog are laboratory data, specifications, and methods of application. Presstite cold applied paving joint sealers are described as sufficiently tough and elastic to withstand heavy traffic, cold and heat, with maximum adhesion and resilience to allow for repeated expansion and contraction of the pavement and still prevent infiltration of water and moisture. Application is also described as easy, rapid and economical. The catalog includes photographs and descriptions of equipment for use in applying the sealants.

Diamond Core Drilling

Bulletin No. 330, issued recently by Sprague & Henwood, Inc., Scranton 2, Pa., contains more information regarding their Series "M" Core Barrel than has heretofore been available in print and therefore should be interesting to those who have to do with diamond core drilling. The Series "M" core barrel, used in conjunction with the Series "M" coring bit, is claimed to permit securing a higher percentage of good core from fractured, porous, or soft formations than would otherwise be possible.

Tips on Hose Care

A new bulletin on the care of rubber hose is ready for distribution by Hewitt-Robins Incorporated, 240 Kensington Ave., Buffalo, N. Y. Called "Tips on Hose Care." The bulletin tells what to do and what not to do in the use and storage of hose.

New Line C-Model Two-Axle Tandems

A 12-page booklet describing the Buffalo-Springfield new line of C Model tandem rollers is available from Buffalo-Springfield Roller Co., Springfield, O. The new pamphlet describes the following features of tandems from 5 to 16 tons. Open grillwork over both sides of the drive roll which allows operator to see the roll edge directly through top of machine. Increased ground clearance to 17 in. on 5-9 ton tandems, 20 in. on 8-15 ton tandems. Bevel gear final drive armored by massive steel freight frame member. Heavy duty tapered roller bearings on both axles.

Inert-gas Metal Arc Welding

An 8-page reprint entitled "Will Inert-Gas Metal-Arc Save Money on Mild Steel?" is being offered by Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. Reprinted from The Welding Engineer, this article reports the results of weld tests on mild steel with the inert-gas metal-arc welding method.

Marion's 111-M Electric Shovel

Marion Power Shovel Company, Marion, Ohio, is announcing a new bulletin (No. 408) describing the Marion 111-M Ward-Leonard electric shovel.

The unit carries a standard 4-yard dipper or bucket, and is featured as shovel, dragline, clamshell, crane, and coal loader. As dragline, the bucket capacity varies from 3-4½ cu. yds., depending on the length of boom. Its rated crane capacity is 165 tons.

The 12-Page, 2-color booklet contains illustrations of the unit in many material handling applications. Among outstanding features mentioned are: design for heavy, continuous service; fast cycle time; Ward-Leonard controls; and improved 600-line motors.

MADSEN TEAMWORK PAYS YOU...

➤ **GREATER TONNAGE!**

➤ **GREATER PROFITS!**

The MADSEN 3000-lb. Asphalt Plant shown below, operating in conjunction with a MADSEN Dryer, a MADSEN Dust Collector Unit and MADSEN Feed Bunker Assembly...is a good example of how MADSEN Asphalt Plant equipment work together to give you maximum tonnage at minimum cost. The unit construction of MADSEN Plants...the complete portability of the units...the minimum number of pieces to assemble...and the easy maintenance features throughout the equipment are a few of the reasons why MADSEN surpasses all others. Why not make your next plant a MADSEN?



There's a MADSEN Asphalt Plant to fit your needs. Write today for literature.

MADSEN IRON WORKS, INC.
P. O. BOX 589 • HUNTINGTON PARK, CALIF.

One-Man Lightweight Power Brush Cutter

A 4-page circular on its new brush saw has been issued by Brushmaster Saw, Inc. The shaft driven circular saw is powered by a 2-cycle engine, 1½ in. bore by 1½ in. stroke. The saw weighs approximately 35 lb. and cuts brush and undergrowth up to 4 in. in diameter. It is stated that the Brushmaster operated by one man will cut as much brush in a given period of time as six good hand cutters.

Filters for Oils, Coolants and Lubricants

A new 12-page catalog (No. 106) announced by Marvel Engineering Company, Inc., incorporates all the latest information and improvements in the Marvel synclinal filters for hydraulic oils, coolants and lubricants. Cut away drawings, parts lists, dimensional charts, engineering data, typical installation, actual mesh sizes and flow and pressure drop tables are shown. The synclinal design is claimed to have 2½ times more active filtering area and less flow restriction. In addition it is easy to clean.

Qualities of Carbon-Graphite Electrodes Compared

Electrodes of special carbon-graphite composition have been developed by Arcair Co. for use with "Arcair" gouging and cutting torches. Relative qualities of Arcair carbon-graphite electrodes are compared to all-carbon or all-graphite electrodes, and details of actual performance given in a new booklet.

Unusual Survey Problems and Their Solutions

"The Surveyor's Notebook—Series Two" a collection of short articles on unusual surveying problems and their solutions, has been published by W. & L. E. Gurley, 108-year old manufacturer of engineering and scientific instruments. Relating actual field problems and their solutions, the stories and surveying tips are told in the surveyor's own words. The stories in the collection are new. Among the stories in Series Two are experiences in surveying the Antarctic; methods for eliminating errors in precise alignment; and a discussion of how to cut down weather problems in the field.

One page shows how to subdivide 50,000 acres into nearly 200 lots in accordance with the rights of 600 people. Another tells how one man brought in stations in the muck of the Red River Valley. Among the surveying tips included in "The Surveyor's Notebook" are recommendations on the use of the gradienter; the method for using a level on a tractor for whipping mud flats; and a system of determining in the field, without calculation, whether or not a survey will close. Also described are ways to get more out of a compass, and new sources of income for the surveyor, who can be called in on alignment jobs inside industrial plants. Copies of "The Surveyor's Notebook—Series Two" can be obtained free of charge.

Time Saving Machine for Calculating Percentages

Finding percentages is essential to so many statistical operations that laboring computations on old-fashioned machines without printed proof represents a continuing time and energy loss. The Printing Calculator, described in Booklet A-6639 Rev. 1 of Remington Rand, Inc., reduces this operation to the simplest possible form. Simply enter the smaller amount and subtract, enter the larger amount and add, and then divide by the previous sales and the percentage of increase or decrease is delivered automatically printed on the tape. Since the Printing Calculator provides automatic clearance you go on to the next calculation immediately; there is no need for copying or for a recalculation.

(Continued on page 127)



Move a Mountain



or Push
Some
Pebbles

Whatever the job, there's a SHUNK blade designed to do it efficiently and economically. For almost a century SHUNK has been manufacturing a full line of fine cutting edges rolled from top-quality steel to fill any maintenance or construction need . . . whether it's gravel, dirt, shale, snow or rocks.

Original equipment manufacturers specify them because of their durability . . . contractors use them because of their dependability . . . distributors like to sell them because they're priced right and deliveries are prompt.

Write us for recommendations on the proper SHUNK blade for your job.

3,000 DIFFERENT SPECIFICATIONS



SCRAPER BLADES



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In Our 99th Year

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BUCYRUS, OHIO

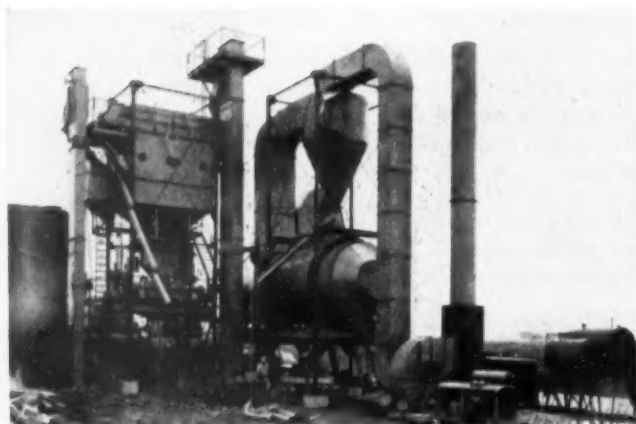


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there
is a
**LITTLE
BULL...**

in most all advertisements
of construction machinery—
particularly Asphalt Plants

If you will review some trade journals, you will learn that practically every make of every type of construction machinery on the market is the most dependable, the most durable and economical, the fastest producing, and the most accurate.



**AN ASPHALT PLANT, "A LIFETIME INVESTMENT,"
IS TOO IMPORTANT TO BUY ON "SALES TALK" . . .
IN ADVERTISEMENTS OR BY SALESMEN**

To get the facts about all makes of asphalt plants, talk to the men who own them and the men who run them.

Any Simplicity Plant or Simplicity Plant Owner will do a much better job of convincing you that Simplicity is the very best, than all the "bull" our advertising agency can write or our salesmen can shoot.

But to justify the expense of this ad we must still "shoot the bull" by saying SIMPLICITY is the most **DEPENDABLE, DURABLE AND ECONOMICAL ASPHALT PLANT EVER BUILT**—THE FINEST MONEY CAN BUY.



**THE SIMPLICITY
SYSTEM COMPANY**
DIV. OF WEST CONSTR. CO.

RIVERSIDE DRIVE
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P.S. Write us for location of the Simplicity Plant nearest you.
See it in operation; talk to the men who run it!



BITUMINOUS SPREADER

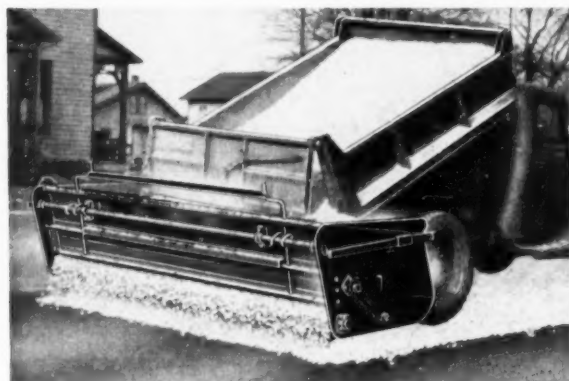


It lays asphaltic mats comparable to the most expensive machines—but at a fraction of the initial and operating costs. The BURCH can be used with any dump truck without special attaching equipment.

Complete and independent adjustments of feed gate and strike-off blade are provided which—together with flexible hitch and long wheel base—assure a uniform mat under all conditions.

BURCH FORCE-FEED CHIP SPREADER

Dual feed control assures accurate feed over the roll. Get the exact amount of material required to meet any specification. Flow starts and stops instantly with feed roll. No blank spots, no dribbling, no excess material to be raked out. Lays a stone mat equally well moving forward or backward.



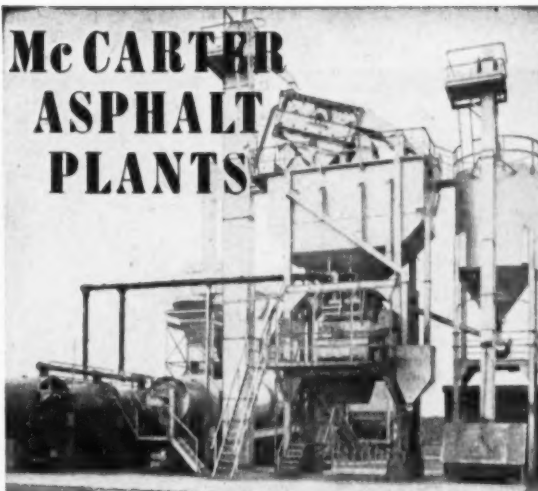
Other BURCH Machines

Cement Spreaders for Soil Stabilization, Sanders, Salt Spreaders, Bituminous Pavers, Multiple-Blade Road Maintainers, Combination Trench Filler and Road Widener.

For complete information write Dept. R-83



Mc CARTER ASPHALT PLANTS



TRULY BALANCED PLANTS OF 2000 TO 6000 LB. MIXER CAP.

- McCarter . . . backed by 20 years experience . . . designs and manufactures this equipment in their own works, assuring standardized parts and minimum costs.

- McCarter standard plants are readily adaptable to your special requirements. Individual units are also available.

DRYERS (Hot or hot and cold material, center outlet type)

MIXERS, ASPHALT BUCKETS (Steam, hot oil or electric heated)

AGGREGATE HOPPERS, BINS, APRON TYPE FEEDERS, CYCLONE COLLECTORS, ELEVATORS, STEEL STRUCTURES

REPAIRS AND MODERNIZING
We specialize in remodeling old plants for better production and more efficient operation.

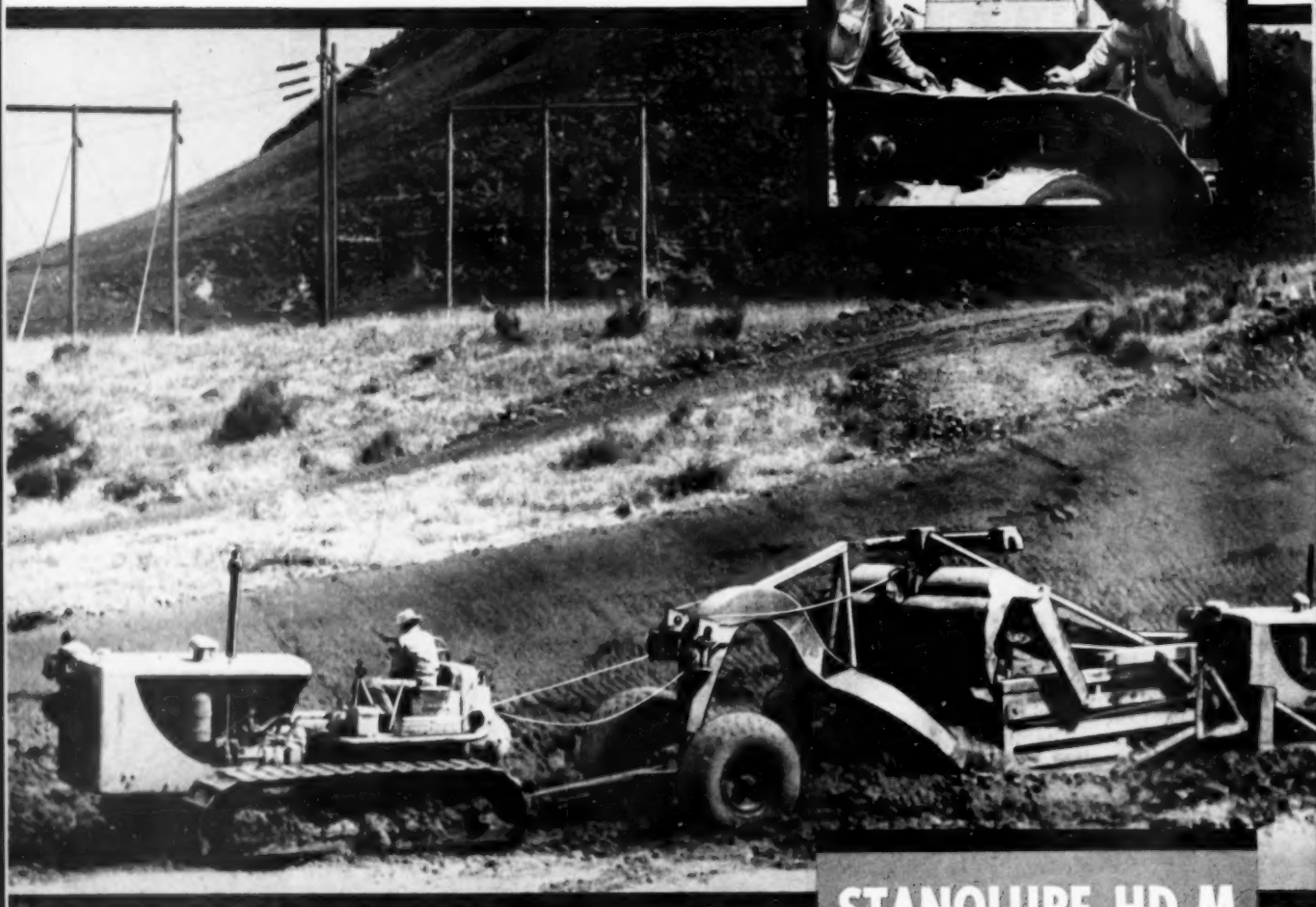
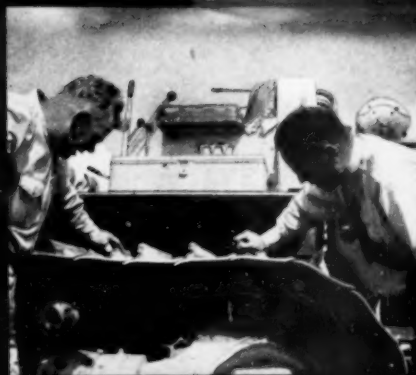


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IRON WORKS, INC.

NORRISTOWN, PENNSYLVANIA

They're on the right track! Mr. G. G. McAfee (left), official of Winston Brothers Company, and Mr. Tom Gearhart, Standard's Automotive Engineer, have worked closely together to make "molehills" out of mountainous lubrication jobs.



They made "Molehills out of Mountains!"

STANOLUBE HD-M
REG. U. S. PAT. OFF.
Motor Oil

To bring water from the Colorado River to the eastern plains of Colorado, men and machines have driven a 13-mile tunnel through the Rockies, hacked out vast reservoirs, and built great dams of earth and rock fill. They have literally made "molehills out of mountains!"

Winston Brothers Company, Constructors and Engineers, of Minneapolis, has played a major role in this vast construction project. Important to the successful operation of Winston Brothers' wide array of equipment has been Standard Oil's fleet lubrication service and the performance of STANOLUBE HD-M Motor Oil. Despite continuous operation of equipment, severe overloads, high engine speeds, and exposure to dust, sand, and water; STANOLUBE HD-M has kept engines clean

and protected against wear. A minimum of maintenance has helped Winston Brothers keep equipment working on a basis of two 8-hour shifts, 6 days a week.

Standard's fleet lubrication service has accomplished the imposing job of supplying the right lubricants for the right jobs right on schedule. A Standard Oil Automotive Engineer has worked closely with Winston Brothers to give them help when they needed it.

You can put Standard Oil's fleet lubrication service and STANOLUBE HD-M to work for you by phoning your local Standard Oil office. Or write: Standard Oil Company, 910 S. Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY



(Indiana)

FOR SALE

- A. Crane or Shovel—Lorain—L.80—Serial No. 15925—Diesel engine "Caterpillar"—D-13000.
Westinghouse Compressor & Air Brakes—Wisconsin starting engine Model ABS—Serial No. 756325.
70 ft. Boom—15' 6" Extension Jib.
Two shovel dipper sticks 13 1/4 c.y.—one 14 ft. and one 24 ft.
In good condition—Sales price f.o.b. yard, Dayton, Ohio \$25,000.00
- B. Clamshell—Blaw-Knox Company, 1 1/2 cu. yd.—Model No. 716 H. Serial No. AA 7177—General Purpose—Weight 5,480 lbs.
Used very little—Sales price f.o.b. yard, Dayton, Ohio \$750.00
- C. Dragline Bucket—1 1/4 cu. yd.—By Page Engineering Company Serial No. 4-1869—Weight 4,200 lbs.
Good condition—Sales price f.o.b. yard, Dayton, Ohio \$350.00
- D. Aggregate Bin & Weigh Batchers, Manufactured by C. S. Johnson Co. Two (2) Compartment 80 Ton with scales.
In good condition—Sales price f.o.b. yard, Dayton, Ohio \$600.00
- E. Jaeger Machine Company—Concrete Screw Spreader—Type CS, Size CS10—10 ft. to 14 ft. wide—Serial No. 405X45—Continental Gas Engine—Serial No. 226867.
Has been used very little—Sales price f.o.b. yard, Dayton, Ohio \$3,000.00
- F. Jaeger Lakewood Tandem Concrete Road Sced and Finishing Machine Type H—Serial No. 45X014—Adjustable, 10 ft., 12 ft., 14 ft., 20 ft. Waukesha Gas Engine—Model F.C.—Serial No. 55724.
Used very little—Sales price f.o.b. yard, Dayton, Ohio \$4,500.00
- G. McCarthy 6" Rock & Earth Drill (Vertical)—Manufactured by Salem Tool Company, Salem, Ohio—Serial No. 639—Model 106.
Hercules Gas Engine—Model QXC5.
6 Cyl. 3 1/4" x 4 1/4"—Mounted on White Truck
1—Head No. 349 with Bits & Wedges
2—Kenametal Heads
2—Heads No. 347D
10—Auger Sections 6" x 5 ft.
1—Finishing Tool
1—Universal Coupling
Drill is in very good condition—Sales price, including Truck, f.o.b. yard, Dayton, Ohio \$5,000.00
- H. Two (2) Herman Nelson Company—Space Heaters—Model GT. 3050 with Briggs & Stratton 1 1/2 H.P. Gas Engine—Capacity 250,000 B.T.U./hr.—Serial No. 347875 & 352949.
Sales price each—f.o.b. yard, Dayton, Ohio \$350.00
- I. Pumpcrete—Chain Belt Company—Rex—Model 200—Serial No. CPD-185—Waukesha Gas Engine on Mixer—Model 6 MZR 1438—Motor No. 513694.
Pugmill Remixer—Serial No. R.D.-193 with the following 7" Pipe & Fittings:
40 pcs.—10 ft.
5 pcs.—3 ft.
3 pcs.—3 ft.
2 pcs.—2 ft.
2 pcs.—1 ft.
2 each—2 ft. Shut off Valves.
2 each—Water inlet Valves.
1 each—Manifold & Washout Hose.
3 each—Adaptors 8" to 7" 6 ft. lg.
2 each—Lt. Wt. Spouts—8 ft.
2 each—Lt. Wt. Spouts Hangers.
1 each—Cleaning Rod.
1 each—Turn Buckle.
2 each—Pipe-cleaning Godevils.
1 set—Wrenches & Tools.
Used very little—in good condition—Sales price f.o.b. yard, Dayton, Ohio \$8,000.00

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- (AEC RATES)—KOEHRING
1005 Crane, 110' Boom, No. C7088, \$52,500.00
Buda Diesel
605 Crane and Shovel, C6089 (avail.) \$32,500.00
able 90 days
502 Crane and Shovel, D13000 Diesel \$14,000.00
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Final closing date is the Fifteenth of the preceding month. Magazine is issued 1st of publication month. If proof desired, copy must be received 5 days preceding closing date.

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1—HD14 Allis-Chalmers w/Baker hydraulic straight dozer 11' wide blade. Good tracks, rollers, and sprockets, new paint job and in excellent condition.

1—TD9 International crawler w/Hough cable loader 1 yard capacity bucket. Northwest No. 6 Comb & Clam 50 ft. Boom. Long Wide Cat. Wisconsin gas engine. Price \$10,000.

22-B Heavy Duty Comb Clamshell Dragline Crane Cat D-318 Engine Mach. 3 yrs. old; in good condition.

Stationary 2020 Double Impeller Gravel plant complete with feeder Hopper Grisley 2 lattice frame conveyors, horizontal vibrating screen and washing plant; electrical powered unit like new condition. Used approx. 3 months.

1—D6 Caterpillar w/Trackson cable loader, 9V series.

1—D6 Caterpillar tractor w/T6 Trackson cable loader. New paint job, engine and loader A-1.

1—4 wheel tire LeTourneau 12 yard scraper—immediate delivery.

1—Adnun black top paver—very good condition, complete with six cylinder Hercules engine, 12' extension and electric screed heater.

Lorain Model 75-B 1 1/4 yd. Comb & Dragline 50 ft. Boom. Cat D-13000 engine mach. in very good condition. Price \$11,000.

1—Erie Strayer portable concrete mixer mounted on rubber tires, electric motor driven, 1 yard mixing capacity, complete with cement bin and cover, elevator chain, tackle block and loading hopper. Unit in very good condition.

1—Jceger paving spreader serial 50x802, width 20-25' with all attachments. Continental gas engine, new 1950 and in good condition.

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1—WAYNE Model 22 mobile crane and trenchhoe combination, 30' boom, clamshell bucket, and 2 hoe buckets. F.O.B. Milwaukee \$9,000

PACKAGE UNIT

1—1948 A.C. HD5 tractor loader, new motor in 1951. Equipped with 2 buckets, B.E. 4 cu. yd. scraper. . . . 1—DODGE C.O.E. 4 cu. yd. dump truck and 8-ton tilt type tagalong machinery trailer. Complete package, F.O.B. Milwaukee \$7,500

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- 1 Koehring Dragline and Crane, 1/2 yd. with 55 ft. Boom, wide pads and long crawlers. Rdcmatic Tagline, 1950 Model
- 1 Gallion Model 101 Motor Grader, Scarifier, Cab, U. S. 14 International Diesel. Serial No. M5389
- 1 Lima Paymaster 3/4 yd., 100 ft. Boom, Dragline Bucket, Shovel front, Cummins Diesel Engine, 1948 Model
- 1 Farmall Model C Wagoner Front-end Loader and Blade, Narrow and Wide Front Axle
- 1 P. & H. Dragline 3/4 yd., 45 ft. Boom, Waukesha Gas Engine
- 1 New 1/2 yd. Blaw-Knox Clamshell Digging Bucket
- 1 Allis-Chalmers HD10 Tractor with Baker Hydraulic Bulldozer
- 1 Allis-Chalmers AD3 Motor Grader Rebuilt, excellent condition
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- 1 Allis-Chalmers MODEL S Tractor with Baker Hydraulic Bulldozer

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24 x 32 24 ply New Goodyear Traction Grip Tires and Tubes. 100% Natural Rubber. \$1200.00 each.

Two Model BBU Woolridge Scrapers, 18 x 24 tires. Like New. \$2700.00 each.

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- W. H. RINGWALD & SONS CO., INC.**
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- 1—Cat. No. 11 Motor Grader, Ser. No. 6K545P. Clean Gov't surplus **\$1,050**
- 1—3/4 yd. General Upper Crane works with almost new Continental motor, Serial No. 1416 **\$1,950**
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- 2—TD14 Int'l Tractor w/Hughes Keenan Swing Crane, Gov't surplus, excellent condition **\$5,950**
- 1—New General Model 321, 3/4 yd. 25 ton truck crane, 65' boom. Serial No. 3344 **\$24,500**
- 1—Link Belt Cruiser Crane, Model M5 70, 20 ton, 3/4 yd. 4/65' boom and 15' jib mounted on Maxi self propelled chassis, Gov't surplus, excellent cond. **\$19,500**
- 1—Michigan Truck Crane, 45 ft. boom, Model TM DT 16, 5/8 yd. Gov't surplus, excellent condition.
- 1—Schild-Bantam Model M-49 Crane, backhoe or drag, mtd. on GMC 6x6. Good condition **\$5,950**
- 1—Osgood Model 200, 5/8 yd. w/torque converter and backhoe attached, PM 35" bracket.

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| <p>27—Euclid Bottom-Dump, 13 c.y. Tractor-Wagon Units, Model 43FDT, G-M 671 and 6A Diesel Engines, with 58W Wagons, 21:00x24—24 ply tires. New 1950.</p> <p>10—Euclid Bottom-Dump 13 c.y. Tractor-Wagon Units, Model 67FDT, G-M 671 and 6A Diesel Engines, with 58W Wagons, 21:00x24—24 ply tires. New 1950.</p> <p>8—Euclid Bottom-Dump 13 c.y. Tractor-Wagon Units, Model 38FDT, G-M 671 and 6A Diesel Engines, with 89W Wagons, 24:00x25—24 ply tires. New 1950.</p> <p>38—Euclid Bottom-Dump 13 c.y. Tractor-Wagon Units, Model 71FDT, G-M Model 6A Diesel Engine, with 89W Wagons, 24:00x25—24 ply tires. New 1951.</p> <p>9—Euclid Model 8TD Rear Dump Units; 56Y Bodies with side extensions, 16.8 c.y. capacity. Powered by Cummins Model 27575P Diesel Engines. New 1950.</p> <p>5—Euclid Model 49FD Rear-Dump Units, with 48BY Bodies, 12 c.y. capacity, powered by G-M Model 671 Diesel Engines.</p> <p>1—Euclid 3BV Loader, Serial BV-22; powered by Cummins HBID 600 Diesel Engine.</p> <p>4—Caterpillar Model D8 Diesel Tractor-Dozers, all in 8R Series, Serial Nos. 8R9048, 8R8981, 8R8423, 8R8073.</p> <p>1—Allis-Chalmers Model HD19H Tractor-Dozer, Serial 309. G-M Diesel Engine Mod. 671. Caterpillar 85 Dozer and LeTourneau heavy duty P.C.U.</p> <p>2—Caterpillar Model 12 Graders, with scarifier and canopy top, powered by Caterpillar 9K Diesel Engines; Serial Nos. 9K1848 and 9K1501.</p> | <p>3—LeTourneau Model CIH Scraper Units, 12 c.y. capacity, Cummins HBID Diesel Engines: equipped with Model LP Scrapers. Serial Nos. C3T2887, C3T2886, C3T2826.</p> <p>1—LeTourneau Model K30 Rooter, three-tooth, extra heavy, Serial R3032-K30B.</p> <p>1—Rome Disc Harrow, 4 sections; 6 discs per section, 28" diameter; Model M-24-28, Serial 246F.</p> <p>Group of 4—Southwest Heavy Duty Double Drum Sheepfoot Rollers, Mod. TD2-102, Serials 12833-34-35-36.</p> <p>1—F. W. McCoy Heavy Duty Double Drum Sheepfoot Roller, Model USHD-55, Serial S-4811.</p> <p>1—Specially Built 3-drum "in line" Smooth Roller.</p> <p>4—Rock Rake Attachments for Heavy Tractors, with LeTourneau push-arm connections.</p> <p>2—Worthington 2-Stage Electric Motor Driven Turbine Pumps. Model #12QGH2, Serial Nos. 1349448-49. Capacity 1500 G.P.M. at 110' Head Operating at 1770 RPM. Driven by 50 HP U. S. Vertical Electric Motors 3/60/440 V. Serial #852148 and 852145. New 1950.</p> <p>2—Worthington 2-Stage Diesel Engine Driven Turbine Pumps. Model #12QGH2, Serial Numbers 1349450-51. Capacity 1500 G.P.M. at 110' Head Operating at 1770 RPM. Driven by General Motors PTA-11111 Diesel Engine, Serial #130592 and 131789. Equipped with Worthington Right Angle Drive Gear Heads and Watson Spicer Flexible Drive with Couplings. New 1950. Has had stand-by use only.</p> |
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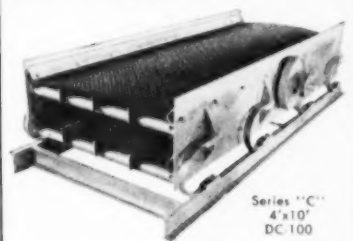
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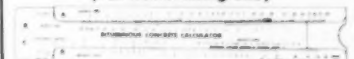


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TRACK-TYPE TRACTORS

"CAT" D8 Tractor s/n 1H537, LeT RDDPCU, push plate. As is—where is \$1,990.00

"CAT" D8 Tractor s/n 1H2884, "CAT" 9R RDDPCU, push plate. Good cond. \$5,500.00

"CAT" D8 Tractor s/n 1H44772SP, front pull hook, master clutch rebuilt. Good condition. \$6,700.00

"CAT" D8 Tractor s/n 1H2892, LeT RDDPCU. Completely reconditioned. Must be seen to be appreciated \$8,500.00

"CAT" D7 Tractor s/n 3T8050, "CAT" 7S Bulldozer and No. 24 Front PCU. Engine and transmission completely overhauled. \$8,500.00

"CAT" D7 Tractor s/n 9G2494, Angledozer, LeT RDDPCU. Fair condition \$3,400.00

"CAT" D4-60" N.O. Tractor s/n 7U13779, electric starter, crankcase guard, "CAT" No. 44 Hyd. Control and HT4 Shovel. In excellent condition \$7,500.00

"CAT" D4-60" N.O. Tractor s/n 7U1761 with IT4 Traxcavator Shovel, 15" grouser tracks. Good condition \$2,990.00

"CAT" D4-60" N.O. Tractor s/n 7U2083 with IT4 Traxcavator Shovel, 13" tracks. Completely overhauled \$5,500.00

"CAT" D4-44" Tractor s/n 5T2988, LaPC Hyd. Angledozer, Hyster D4N Towing Winch. Very good condition \$5,800.00

"CAT" D2-40" Tractor s/n 4U1483, "CAT" No. 2A Hyd. Bulldozer, No. 44 Hyd. Control, electric starter. Excellent condition. \$4,500.00

"CAT" D2-40" Tractor s/n 3J7271, lights, crankcase guard. Excellent cond. \$2,500.00

A-C Diesel HD5B Tractor s/n HD5B-1476, Drott St. Blade Tilt Dozer, 16" tracks, elec. starter, crankcase guard \$2,750.00

IHC Diesel TD18 Tractor s/n TDR122117BJ, Isaacson Hyd. DAW18 Bulldozer, 20" tracks,

crankcase guard, front pull hook, track roller guards. Good condition \$5,800.00

IHC Diesel TD14A Tractor s/n TDW28167GJ, B-E Hyd. Angledozer, 18" tracks. Very good condition \$4,900.00

IHC Diesel TD14 Tractor s/n TDF-792, B-E Angledozer. Good operating cond. \$3,900.00

IHC Diesel TD9 Tractor s/n TDCB37847CP, Heil Hyd. Bulldozer, 18" tracks. Excellent condition \$4,400.00

WHEEL TRACTORS

Case VAI Tractor s/n 5658467 with NEW Henry B&B Backhoe, 18" bucket. Excellent condition \$2,800.00

Tractomotive TL-10 Shovel s/n 148, Torco Torque Converter, lights, counterweight, cab, heater, 3/4 yd. 73" wide bucket. About one year old. Excellent condition \$3,990.00

ENGINES

"CAT" D4600 Engine s/n 7T1659, "R" arrgl., radiator, blower fan, enclosed clutch, safety device. Excellent condition \$2,500.00

"CAT" D13000 Engine s/n 3S3338SP, "WU" arrgl., 151 HP at 1000 RPM, open clutch, extended shaft, outboard bearing, 20" dia. 16" flat face pulley, radiator, tachometer, blower fan, steel channel base. Completely overhauled \$4,100.00

GRADERS

"CAT" No. 212 Motor Grader s/n 1M271SP, single drive, leaning front axle, cab, heater, lights, 10' blade \$1,750.00

"CAT" No. 66 Pull Grader s/n 7H103, power controlled by "CAT" Single Cylinder Gasoline Engine. Excellent condition \$ 600.00

A-C Diesel BD2 Motor Grader s/n BD2-121, tandem drive, cab, lights, heater, Wausau V-type Snow Plow, Wing. Good condition. \$3,700.00

Adams Diesel 412 Motor s/n 640, cab, scarifier, Snow Plow, Wing. Good condition. \$3,500.00

SCRAPERS

LeT U12 Scraper s/n 5-4125U12. 9.3 cyd. struck, 12.5 cyd. heaped capacity. Four 18.00-24 16-ply tires \$1,200.00

Continental CS7A Hyd. Scraper s/n 1076, hydraulic control, 14.00-20 tires. Far use with D6 or D7 Tractor. Good cond. \$ 700.00

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Walter 4-Wheel Drive FKND Truck s/n 6SRKR, 3 yd. capacity, gas engine. 12.00x20 single front and rear tires, cab, heater, Frink Walters V-type Snow Plow and Wing. Hyd. power control. Good condition \$2,100.00

Hyster D6 Hystaway Dragline arrgl. s/n HW40710, complete for installing on D6 Tractor. Used 100 hours. Excellent condition \$4,500.00

Insley K10 3/8 yd. Shovel s/n K338, powered by Buda H260 gas engine. Heavy duty front, extra set of track rollers \$4,500.00

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- 1—Scraper, Gar Wood, 15 yd., Model 510, cable.
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- 1—Sheepsfoot Roller, double drum.
- 1—Adams Motor Patrol, Model 412, diesel, pneumatic tires.
- 1—Allis-Chalmers Motor Patrol Grader, Model AD.
- 1—Caterpillar No. 66 Pull Grader, 12" moldboard.
- 1— $\frac{3}{4}$ yd. Link Belt Speeder, Model 60 diesel shovel.
- 1—Blaw-Knox clamshell bucket, size 680.
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 - 1 Model 34 Sargent dragline, 45 ft. boom, $\frac{3}{4}$ yd. Page bucket, GMC Diesel air controls.
 - 1 D-8 Cat. LeTourneau unit and dozer, 8-R series.
 - 1 HD-10 Cat. with push plate.
 - 1 HD-4 Allis-Chalmers patrol.
 - 1 LS LeTourneau scraper, 8 $\frac{1}{2}$ -11 yds.
 - 2 311 Gar Wood scrapers, 8-11 yds.
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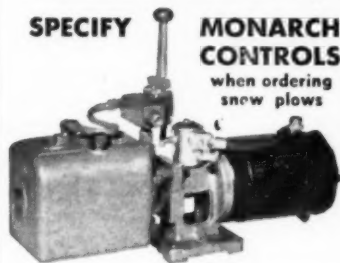
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- 2—EUCALID, Model 9 FDT Tractors with 58 W Bottom Dump Trailers—Cummins Diesels. Priced to Sell
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Write for Bulletin TL-11



Doug-Lynn Co.

2257 North Main Street
WALNUT CREEK, CALIFORNIA

Manufacturers' Literature

(Continued from page 111)

Electric and Gasoline-Powered Hammers and Other Tools

Syntron Company, 384 Lexington Avenue, Homer City, Pa., has just released a new 28-page catalog, identified as Catalog No. 537, illustrating and describing its complete line of portable power tools. It includes descriptive information and specifications on electromagnetic hammers and hammer drills, the complete line of portable electric drills, screwdrivers, nut runners, polishers, sanders, and grinders; and on the new electric impact wrench which Syntron has made available recently.

Similar information on the line of self-contained gasoline hammer paving breakers and rock drills together with concrete vibrators of both the form and flexible shaft mass type have also been included.

The "Gas-O-Matic" Fork Lift Trucks

A new 6-page bulletin describing and illustrating its "Gas-O-Matic" fork lift truck has been published by The Baker-Raulang Company, 1230 W. 80th St., Cleveland 2, Ohio.

This unit is Baker's new electric-transmission truck which uses no clutch, transmission, controller or resistors. One page of the bulletin explains the principle of the "Gas-O-Matic" system with drawings, and lists important claims for fuel and maintenance economies. Dimensions and specifications are included.

Wire Rope Recommendations for Contractor's Equipment

For the first time, Macwhyte Company, wire rope manufacturers at Kenosha, Wisconsin, have made these recommendations generally available. In a small, 4 in. x 6 in., 20-page booklet, as a guide to getting the most out of wire rope. Formerly this information was used by salesmen and distributors but was not specially printed for contractors and other users.

Booklet is well illustrated and contains an explanation of "Wire Rope Constructions" as well as discussions of "Lang Lay vs Regular Lay Rope" and "Internal Lubrication." Shovels, cranes, wheel scrapers, clamshell buckets and other equipment—15 types in all—are covered by diagrams of rope reeving, with recommendations for each rope in each machine.

Wisconsin Air-Cooled Engines

"Mechanized equipment at work" is the theme of the 64-page catalog just issued by Wisconsin Motor Corp., Milwaukee 46, Wis. More than 260 pictures are used to establish it, each with informative text. Locations range from tropics to arctic. Other illustrations show engine details. Specifications, power curves, and general information are given.

Steel Castings Manual Contains Comprehensive Data

Comprehensive data detailing applications emphasizing the reliability, strength and versatility of steel castings as an engineering material are made available in booklet form by Steel Founders' Society of America. Reprinted in manual format, the 16-page illustrated booklet, "Carbon and Low Alloy Steel Castings," incorporates much essential data. Included is definitive material covering steel casting properties, specifications, design, joining, heat treating, and inspection procedures. Of especial value is a 2-page chart devoted to general engineering types of steel castings, classified according to tensile strength.

Strand and Fittings for Prestressed Concrete

A new line of prestressing materials is covered in a catalog issued by John A. Roebling Son's Corporation, Trenton 2, N. J. This new catalog is believed to be the only one on this material. The materials are prestressed concrete wire and strand for pretensioning and strand and wire for post-tensioning. Roebling wire and strand for pre-tensioning are made of high tensile steel that results in products of exceptionally high elastic characteristics. In addition, all wire and the SR grade strand are processed in such a way that their bonding quality is greatly increased. Roebling strands for post-tensioning are fabricated from special, hot-galvanized steel wire, insuring exceedingly high strength and elastic properties. Much engineering data is included in the catalog.

Field Applications of Wire Rope Fittings

A new 6-page brochure on wire rope fittings, announced by Sauerma Bros., Inc., Dept. R-15, 522 S. Clinton St., Chicago 7, Ill., contains blueprint drawings, tables and ordering information on open and double wedge sockets, pins and continuous cable clamps. The brochure also shows pictures of the fittings in various field work and tells of other applications.

Apparatus for Engineering Tests of Soil

A new 72-page catalog (No. 53) published by Soiltest, Inc., 4520 W. North Ave., Chicago 39, Ill., describes and illustrates over 800 items of apparatus for engineering tests of soils, concrete and bituminous materials. The extensive soil testing equipment section of the catalog presents information on triaxial, consolidation, California bearing ratio, compaction, pore pressure, and all of the standard apparatus for field and laboratory engineering tests of soils. A special section is devoted to apparatus for chemical and agricultural tests of soils. Also included are sections on general laboratory apparatus, ovens, scales, mixing machines and laboratory furniture.

Diesel Engine Details

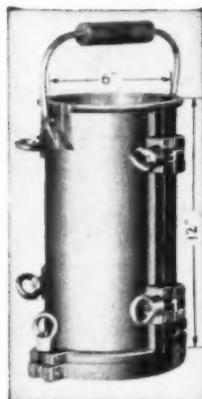
A new 48-page booklet offered by Murphy Diesel Company, 5317 W. Burnham St., Milwaukee 14, Wis., gives detailed descriptions of important engineering design features in diesel engines. In addition, ratings and descriptions of Murphy Diesel models are presented. Nineteen pages of photographs of typical installations are also shown.

Machine for Automatic Bending of Bars

"Bar Bending Machines," a new bulletin (No. 100F), published by Wm. K. Stamets Co., describes Stamets machines for automatic bending of metal bar stock $\frac{3}{8}$ in. to 1 in. in diameter. The Stamets machines will make bends to a minimum of $7\frac{1}{2}$ in. apart, operating at a rate of ten strokes per minute. The new bulletin No. 100-F illustrates the Stamets bar benders and includes construction details and specifications.

Engineering Information on Modern Timber Bridges

Pertinent engineering information on modern timber bridges is contained in an 8-page catalog issued by Timber Structures, Inc. These bridges feature modern engineered connections and glued laminated timbers. Standard bridges include deck arch, girder, deck truss, bowstring truss, trestle and composite deck types. Application of arch centering and prefabricated false work also is included.



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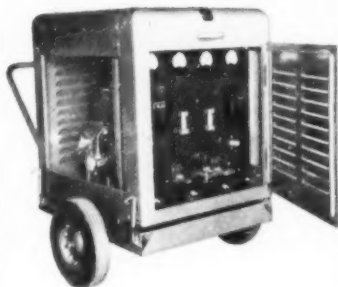
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WITH THE MANUFACTURERS & DISTRIBUTORS

Thor Elects Vice Presidents. Four new vice president have been elected by the directors of Thor Power Tool Co., Aurora, Ill. J. A. Hill, a member of the organization for 33 years, was elected vice president and sales manager. John A. McGuire retains his present title of chairman of the executive committee and in addition becomes vice president in charge of labor relations. B. H. Johns, after a career of 27 years in heading up the company's branches in St. Louis and Philadelphia, and as sales manager of its contracting and mining division, was named vice president in charge of rock drill sales. W. B. Hunn with Thor for 18 years, was elected vice president in charge of the company's Los Angeles works.

Detroit Diesel Field Sales Changes. The Detroit Diesel Engine Division of General Motors, Detroit, Mich., has announced several changes in the assignments of its field sales and service personnel. A. W. Anderson, formerly factory sales representative to Detroit Diesel distributors in the New Orleans sales zone has been transferred to the Los Angeles area in the same capacity. He is succeeded by Ralph Pontius, former factory service representative in the New Orleans territory. Stanley Pillsbury, formerly associated with Detroit Diesel's service training activity has been assigned to the post vacated by Mr. Pontius. Other reassignments include the transfer of Charles Howel, former Los Angeles area sales representative, to the Tulsa sales office. He will serve as assistant to A. F. Campbell, manager of engine sales to the Petroleum Industry succeeding E. J. van Dyk, who has been transferred to the home office in Detroit as a sales engineering consultant.

Shunk starts \$400,000 Expansion Program. Shunk Manufacturing Co., Bucyrus, O., has started a \$400,000 expansion and modernization program. The program will add new equipment and mechanical facilities for more efficient volume production of high-quality, high carbon cutting edges for highway and road construction and maintenance.

Armco Appointments. G. R. Betts, heretofore manager of railroad sales, Armco Drainage & Metal Products, Inc., Middletown, O., has been appointed sales manager of the O'Neill Division of the company which includes Illinois, Indiana and Michigan. Herbert Clark, Jr., has been named acting railroad sales manager.

Bill McGraw Joins Bucyrus Steel Products. Arno W. McGraw, senior partner of Bucyrus Steel Products, Bucyrus, O., has announced that his son, A. William McGraw, Jr., is joining the firm in the active capacity of general manager in charge of manufacturing and sales. "Bill" McGraw, who for more than four years has been manager of sales for the W. A. Riddell Corporation, has been a partner in the firm Bucyrus Steel Products since its inception in 1951, though he has not been actively engaged in its management. "Bill" holds a B.S. degree in Industrial Engineering and prior to joining the W. A. Riddell organization he held a sales position with Marlon Power Shovel Co. Bucyrus Steel Products began operations in their especially equipped new factory on Nov. 1, 1951. They are manufacturers of "precision punched" cutting edges for road construction and maintenance equipment and snow plows.

Maximum Joint Filling

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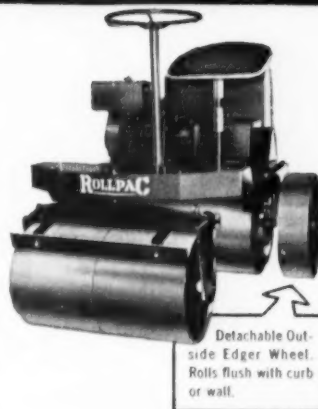
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The local newspaper here in Waukesha carried the first 3-D advertisement in history. Those little polaroid glasses to view it were stitched on the page. Very effective. Lots of progressive things go on in Waukesha.

Better come up and see us sometime.

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

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DAVE GUSTAFSON & CO., INC.
HIGHWAY CONTRACTORS

PHONE 8-3851

SIoux FALLS, S. D.

502 EAST SIXTH

January 9, 1953

Caterpillar Tractor Co.
Peoria,
Illinois

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In July of 1951 we bought our first DW21 Tractor-Scraper outfit. The performance of this machine was so good that we added two more units in February 1952. Since that time we have purchased four more DW21 Tractor-Scraper outfits: two in April and two more in September of 1952 for our road building projects in South Dakota, because we have found that this is the cheapest method known today for handling dirt on projects such as ours.

When we bought the two DW21 Tractor-Scraper units in September we had just started work on a sub-contract from Peter Kiewit Sons Co. for grade construction of the four lane highway from Weaver Airforce Base to Rapid City, South Dakota, consisting of 650,000 cubic yards to be moved in 90 calendar days. Hauls on this job ranged from 400 feet up to 2 1/4 miles one way. Working a single ten hour shift, six days a week our DW21s really put it across on time.

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DAVE GUSTAFSON & CO.

L. S. Malm

L. S. Malm
Vice President

**Bought
one DW21,
reordered
6 more
in 14 months!**



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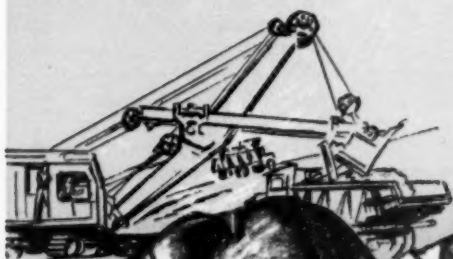
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